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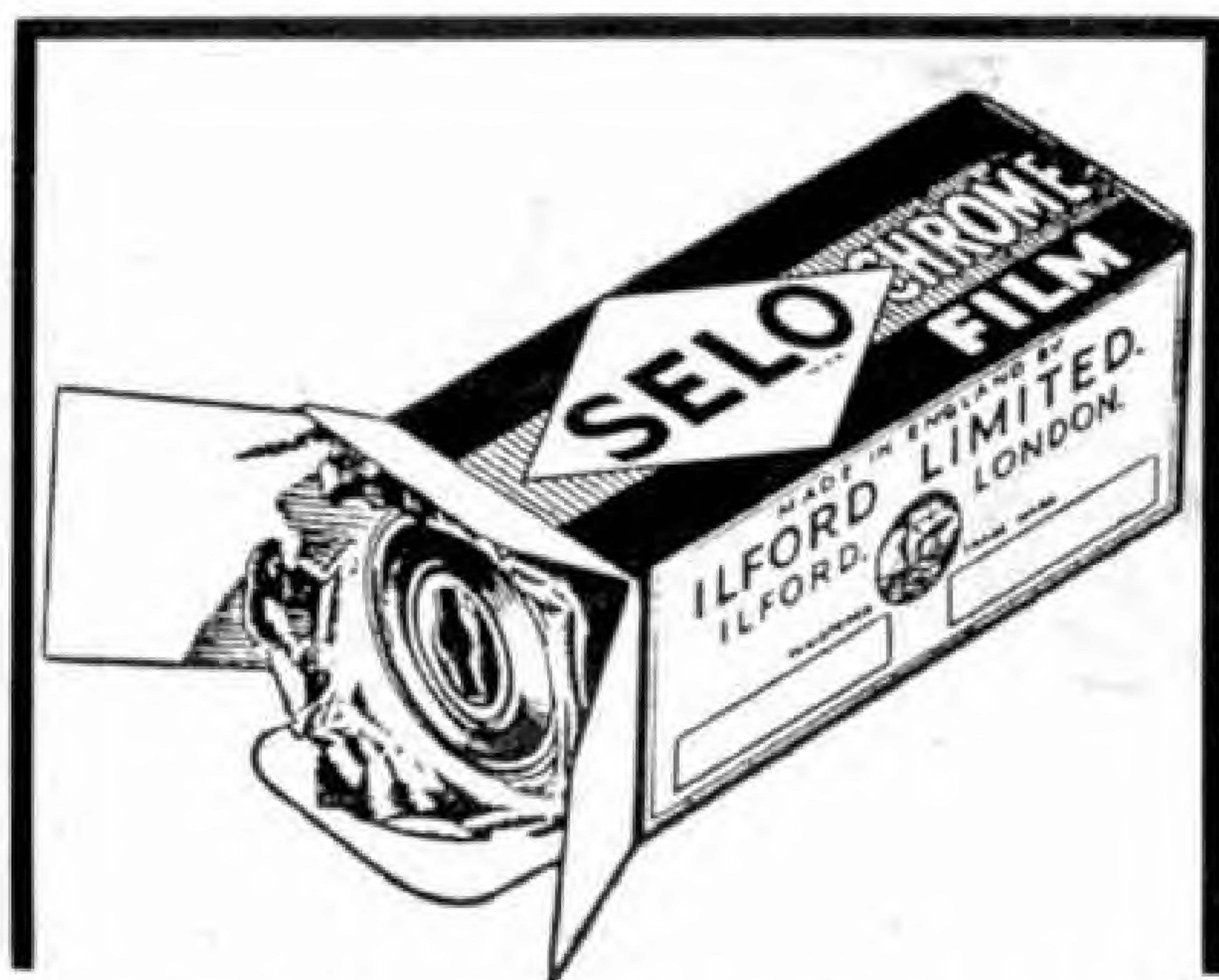
MECCANO

MAGAZINE



A BESSEMER CONVERTER

6^d



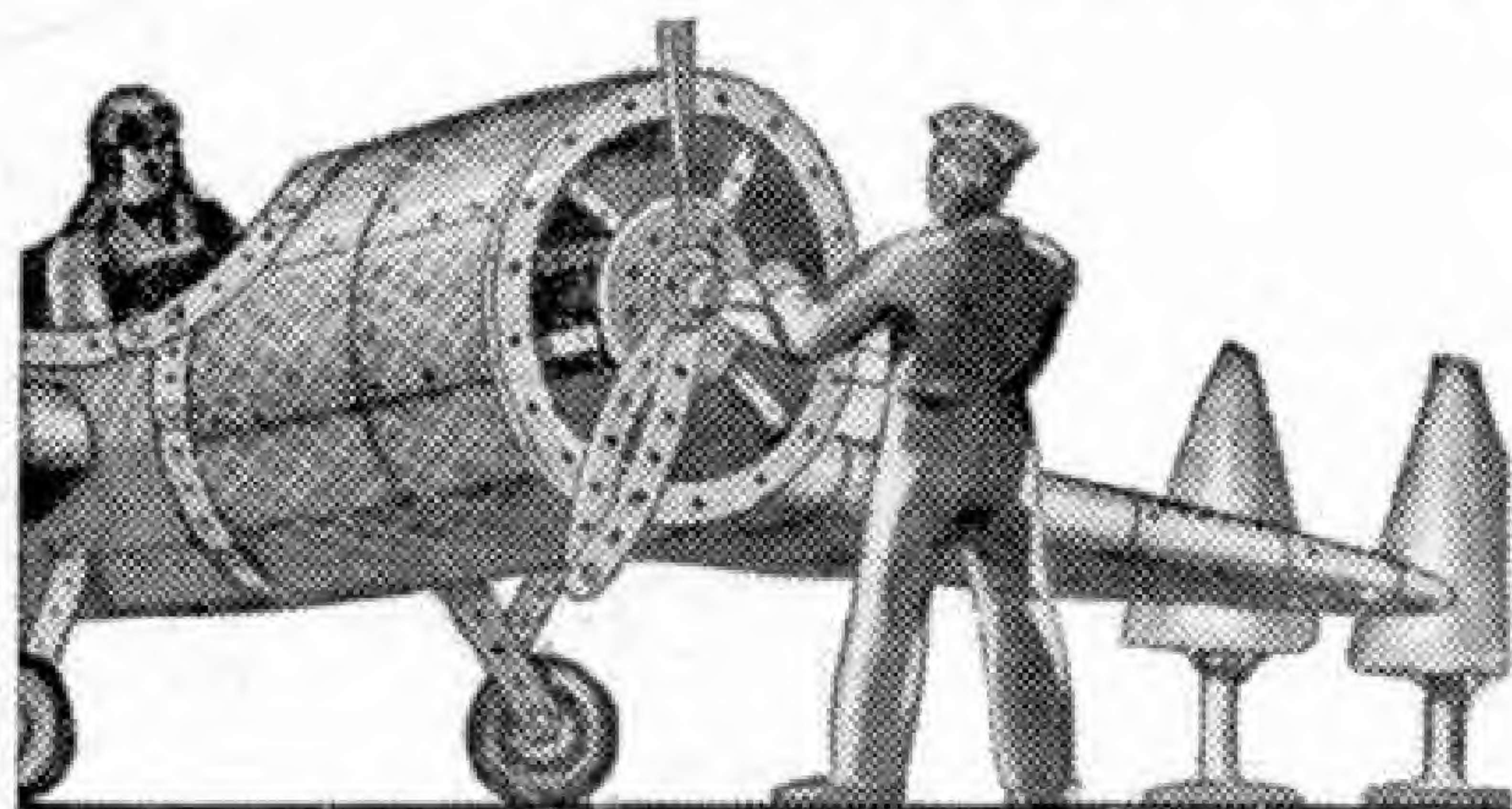
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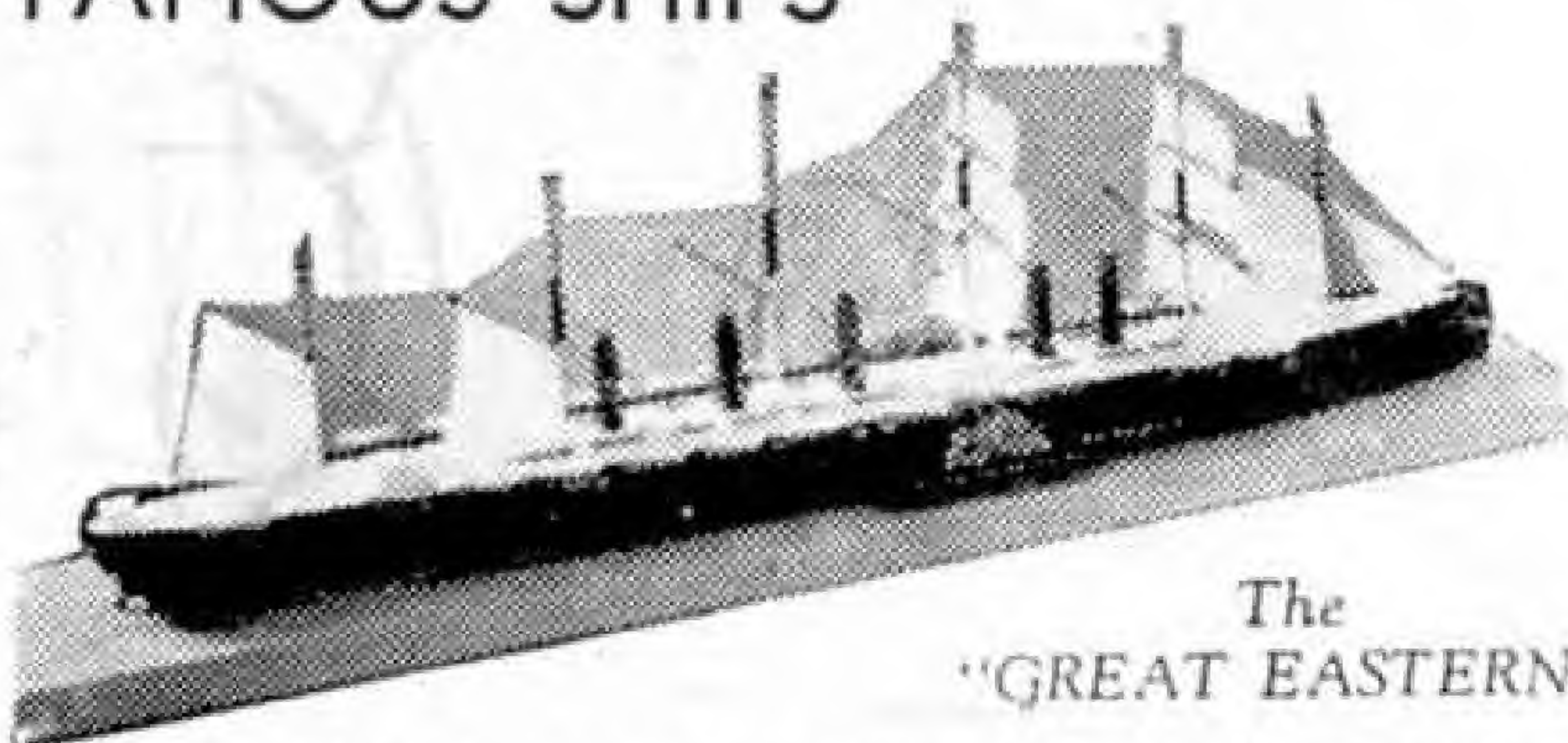
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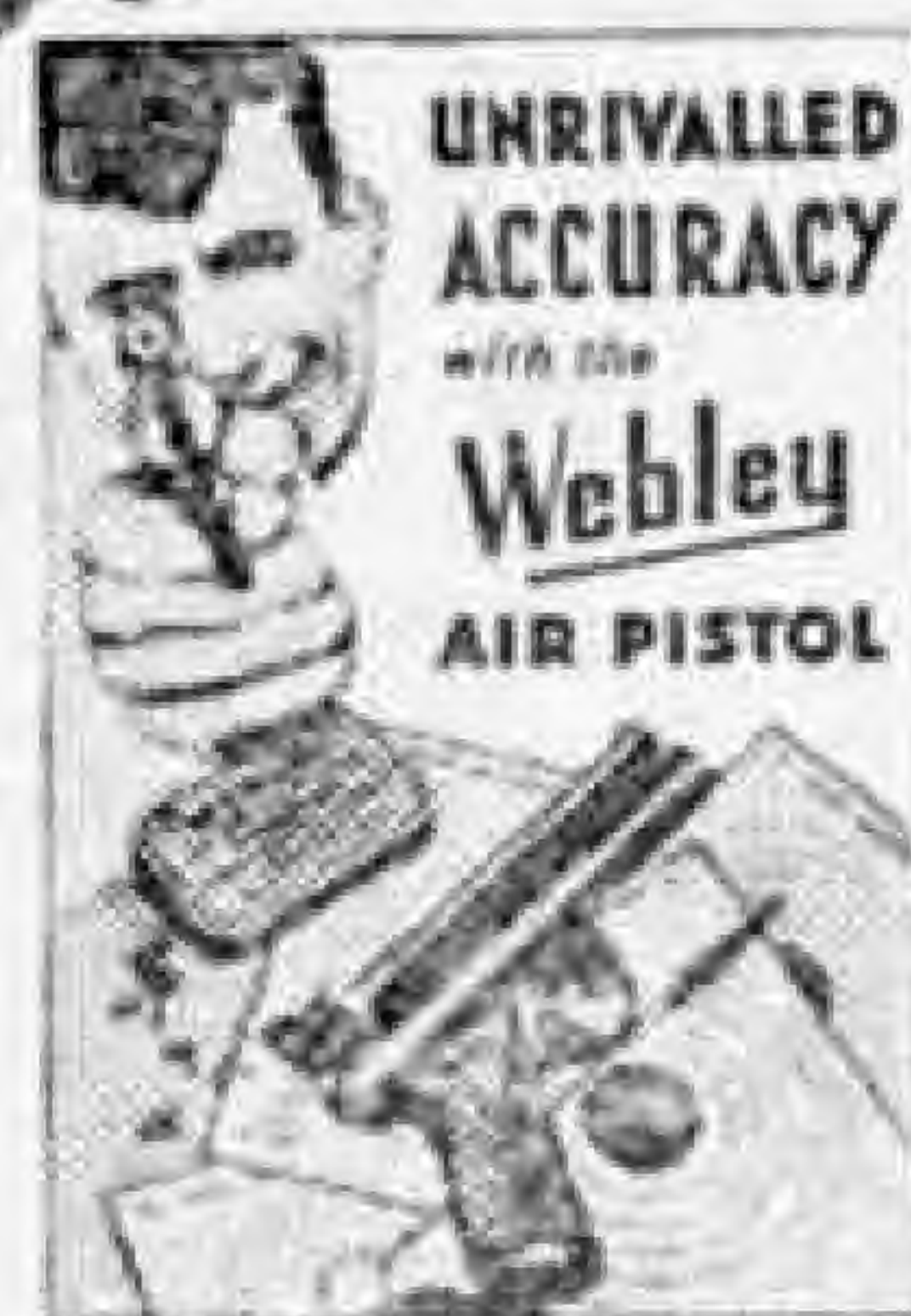
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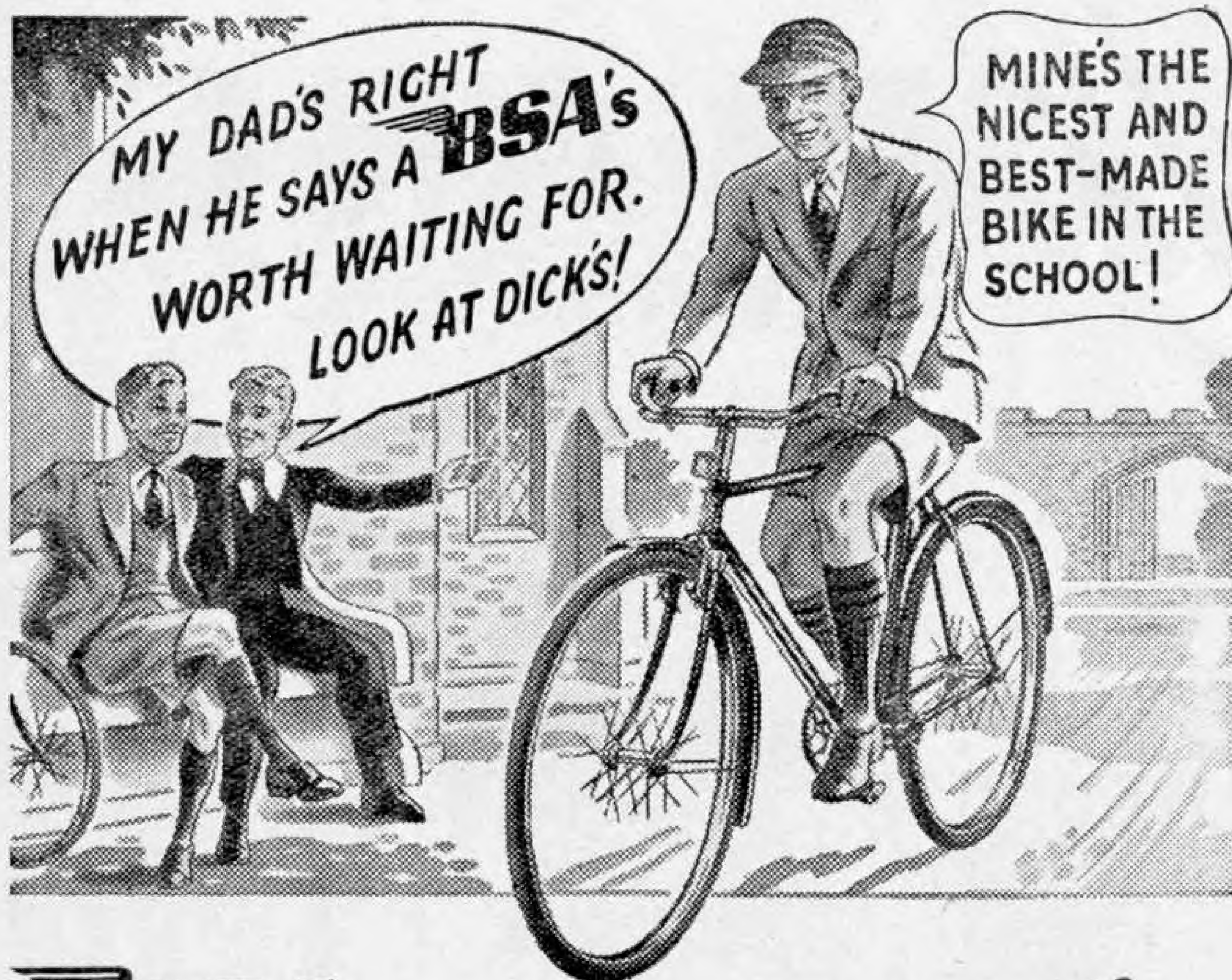
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MECCANO

MAGAZINE

Editorial Office:
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Vol. XXVII
No. 4
April 1942

With the Editor

Marshal Chiang Kai-shek

In previous issues I have published portraits of three of the great National leaders of the Allies—Churchill, Roosevelt and Stalin. This month I come to the fourth, Marshal Chiang Kai-shek. This great Chinaman was born in 1886. As a young man he became a supporter of the revolutionary movement of Sun Yat Sen. When the latter died in 1925 Chiang Kai-shek became Commander-in-Chief of the Army, and directed successful campaigns against rebels. In 1927 he retired, but in the following year he resumed his command of the Nanking Army and assumed office as President of the Chinese National Government. In the years that followed he opposed and defeated various rebel generals, and at the end of 1931 he again retired. He was soon recalled, however, as he was recognised as the only man who could bring about the unity of China and organise the country against Japan.

For over four years Chiang Kai-shek has waged desperate war against the Japanese invaders, and in spite of the loss of much of his country, and particularly of the

rich coastal area, he has carried on the fight unceasingly. The treacherous entry of Japan on the side of the Axis powers has made China an Ally of Great Britain, the United States and Russia.

Chiang Kai-shek has made great history.

He is usually a silent man, but he is capable of making speeches that act as clarion calls not only to his own people but to those of all Allied countries. He is a great general and a great statesman, and he has established himself deeply in the affections and confidence of his countrymen.

Madam Chiang Kai-shek has worked unceasingly with her husband, and has shown immense courage and great power to arouse enthusiasm for the Chinese cause.



Marshal and Madam Chiang Kai-shek.

Mystery Photographs

I have had many requests for more of the "mystery" photographs that appeared on this page during 1929 and 1930. Next month therefore I hope to commence a new series of these familiar objects photographed from an unusual angle. Further opportunities for sharp-eyed readers will be provided on the Competition Page by drawings containing errors purposely made.

Salvage from Household Rubbish

By T. R. Robinson

THE contents of the dust-bin may not seem to be particularly promising material, but as the big wartime salvage schemes have shown, a large number of substances that are valuable in many ways can be recovered from it. Almost every city and town has a works devoted to the sorting and salvaging of household refuse, but in West London there is a unique and remarkably efficient plant of this kind operated by Hyganic Ltd. It deals principally with refuse collected in the Borough of Kensington, and is designed to allow as much as possible of the

tower, at the top of which is a hopper leading to the starting end of the first conveyor-belt. Above the hopper, and running across the whole length of the tower and pits, is an overhead travelling crane carrying a special grab, which transfers the refuse from the pits to the hopper.

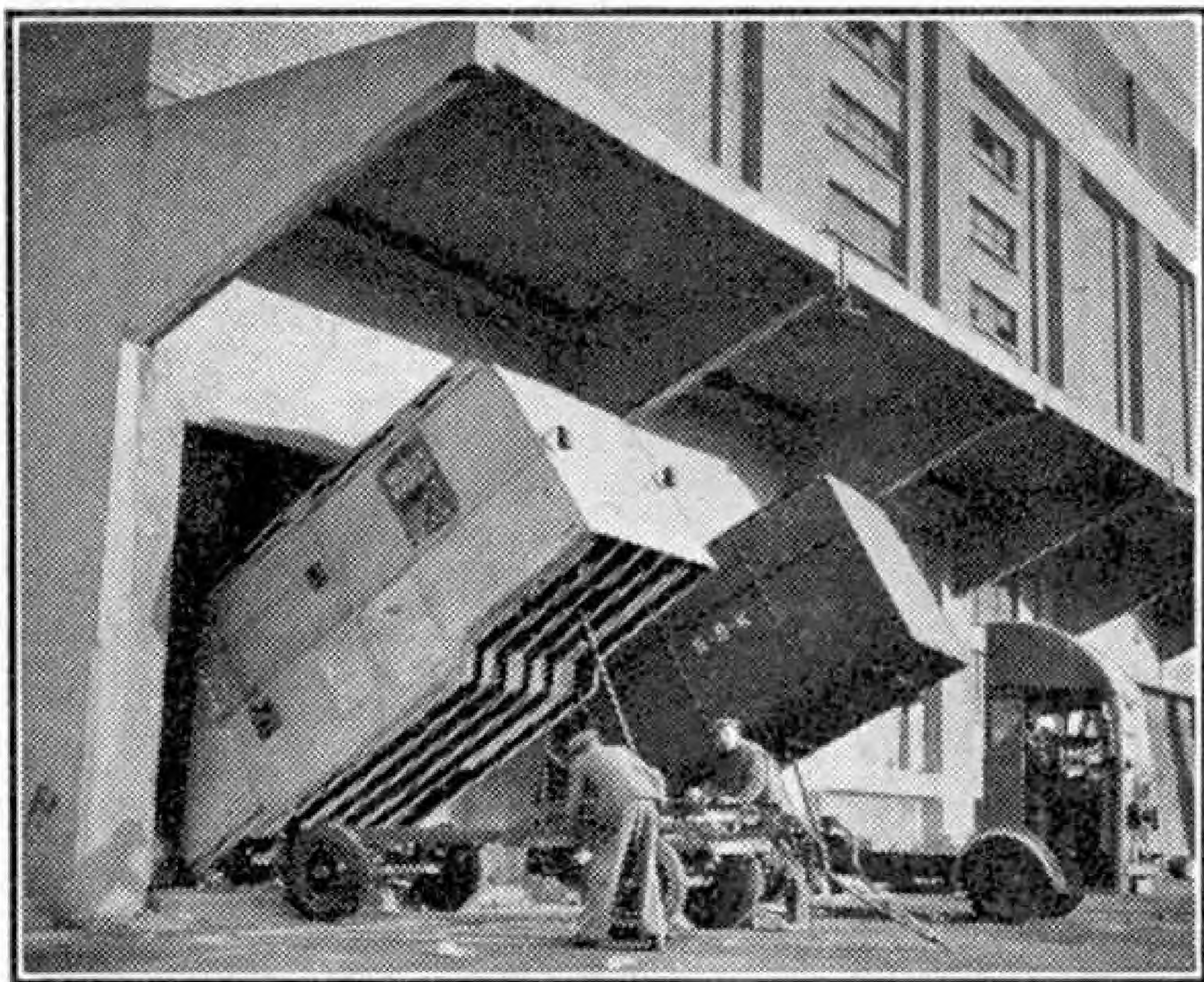
The van-loads of refuse are tipped from the vehicles into one or other of the pits, and when a sufficient quantity has arrived the crane sets to work, taking each pit in turn. The grab has fingers arranged rather like the petals of a flower, and it is lowered

on the heap of refuse with these fully open. The jaws are then closed, scooping in about a ton of refuse as they come together, and the grab is raised so that it can discharge its load into one of two hoppers. As the refuse falls down the hopper and on to the belt, the grab moves back for the next load, and so swiftly does the crane work that the refuse is fed on to the conveyor in an almost continuous stream.

As the conveyor moves along it passes the first sorting position. Here girls wearing heavy gauntlet gloves pick out all the glass, metal, rags, clinker and earthenware that they can as the belt moves along. There are separate bins for each of these materials, and the rapidity with which the girls pick out

useful objects and place them in the appropriate bin is a lesson in efficiency. Easily re-used items such as bottles and jars are placed in special bins for removal to cleansing plants, and card and paper is also specially dealt with.

The refuse that remains on the first belt after this sorting falls on a second conveyor-belt, moving at right-angles to the first, and is carried past a second group of pickers, who sort out smaller items and deal with any objects missed in the first process. By this time all the larger solid objects have been removed, and as the refuse passes one stage of its journey a



Waste being delivered for salvage and final conversion into fertiliser. For the illustrations to this article we are indebted to Hyganic Ltd., London.

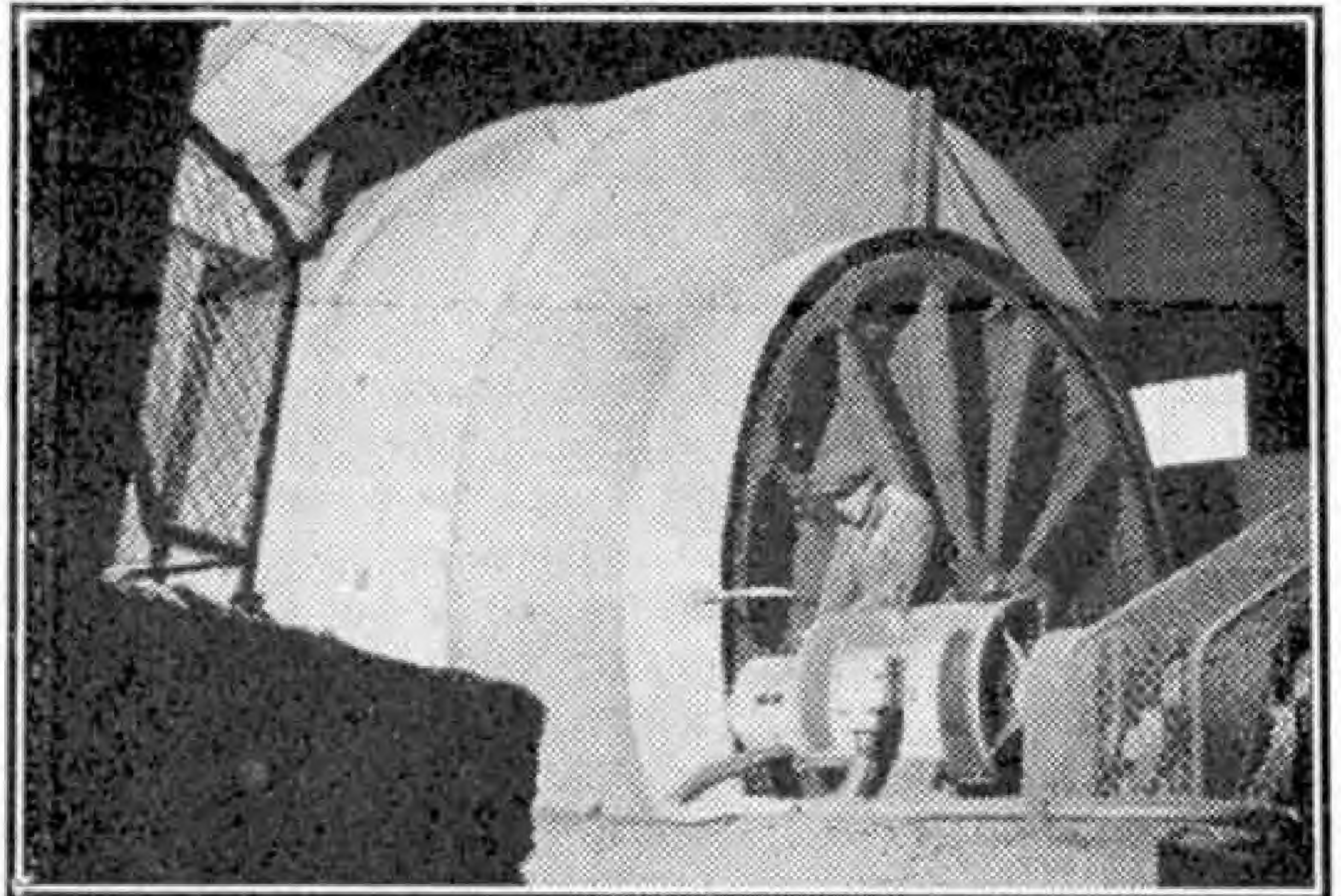
discarded material to be reclaimed for using again. Then, by means of a special process, the remainder is converted into a valuable fertiliser for agricultural purposes.

The factory of Hyganic Ltd. is a very modern one, and extensive use is made in it of conveyors and flow-production methods. The refuse-collection vehicles, which come in direct from their rounds in the streets, drive up to an unloading bank that spans the front of the arrival building. Here the first stages of the sorting are carried out. At opposite ends of the unloading bank are two large brick-lined pits, and between them is a high brick

magnetic separator picks out all tins and other iron and steel objects, and drops them down a hopper into still another bin.

The refuse is not yet at the end of its conveyor journey. From the end of the second belt it falls on to a third, which carries the residue to the pulverisers. This belt is rather unusual, for it is mounted on a rail carriage that can be moved a short distance, and the belt also is reversible. By setting it appropriately, the refuse can be carried to whichever of the large rotary pulverisers is in action.

The pulverising machines are huge steel drums rotated by electric motors. The refuse to feed them is poured down a hopper and through a hole in the hub of the drum, so that the machine can work continuously, the refuse entering the drum, being pulverised and passing on without any interruption of the action of the machine in use. Inside it are steel balls and grids that pound and grind the refuse as the drum revolves, and so render it fine enough to pass out through the steel mesh of which its walls consist. Material that cannot be pulverised and thus fails to pass the mesh is propelled to the back of the drum, and falls into a separate compartment, from which it is ejected at



One of the steel drums in which waste is pulverised.

series of jets of water containing bacteria cultures. The water flows gently on to the moving stream of refuse and is rapidly soaked up. The bacteria contained in it perform the important part of the work in changing the ground-up refuse into useful fertiliser. Several kinds of bacteria are embodied in the spray, and particular care is taken to develop their strength and virility, and keep it constant. The exact nature of the spray liquid and its application is based upon a complex technique, and the success of the process depends upon skilful handling by the technical staff. The action of the various bacteria during the subsequent fermentation process is highly important, and strict control is essential.

After the refuse has been sprayed, it moves along to a point where it is again transferred to a new conveyor, which is at right angles, and can be adjusted to discharge its load in one or other of 18 large fermentation cells. The cells are rectangular, brick-lined structures, each with a capacity of 200 tons. The refuse falling off the end of the conveyor passes down hoppers into the selected cell, and when this is full, it is closed by the lowering of the filling-hatch doors. Compressed-air is then pumped in to help the bacteria to heat up the mass and to cause fermentation. This is continued for 16 days, during which the material becomes changed from merely ground-up refuse to a very valuable fertiliser.

The air pumped through the cells, together with the gases set free by fermentation, is passed to the scrubber previously mentioned in connection with the preparation of the bacteria spray. A considerable economy is effected by



Sorting out bottles ready for removal to cleansing plants.

intervals on to a belt that carries it to a rejection pit, ready to be carted away.

The pulverised refuse falls upon yet another belt as it leaves the drum, and is carried along to a point where it passes under a bacteria spray. This consists of a

this use of water from the scrubber to prepare fresh bacterial spray water. On the completion of the 16 days fermentation period the cell is opened and its contents are removed by an overhead crane and a grab.

"Hyganic," as the substance is now called, can either be fed on to a conveyor that takes it direct to the lorries, for delivery to purchasers, or it can be passed to a bank of crushers to give material of finer texture. These crushers are of quite a simple type, but they operate very rapidly and efficiently. Careful inspection is maintained to ensure that the mechanical condition of the crushed Hyganic conforms to a standard specification, and this form of fertiliser is in such demand that it is despatched as soon as it is produced. An automatic mechanical shovel is employed to transfer it from the crushers to the waiting motor-lorries.

That is the end of the story so far as the Hyganic fertiliser is concerned, but the other larger items of salvage that were removed from the sorting conveyors go through several different processes before being despatched to the various industries that can use them. The diversity of articles recovered from the conveyors is almost unbelievable. It seems that practically everything that one could imagine is recovered from the refuse at one time or another. Tyres, furniture, clocks, carpets, foodstuffs, and even unignited incendiary bombs have been found. Carpets are found in such numbers that it is worth while to have a small carpet-baling machine for them. Cardboard, of course, is recovered in very large quantities, and this, too, is treated in baling presses, ready for transport to the mills for re-pulping.

The paper recovered is treated with special care, removed from the rest of the refuse at an early stage of the sorting, and re-sorted into various grades. The best is suitable for manufacture into new paper, and is set aside for despatch to the mills. Clean newspaper is pulped and processed into "newsprint" and similar grades of paper for packing and wrapping. Paper of lower grades is used by manufacturers of

pulp-board for cartons, boxes and so on, and also in making munitions.

Bones are carefully sorted out and put aside, for they are very valuable for glue making and similar industries. Bottles and jars go to such places as jam factories, where they are used again after thorough cleansing, and metal, which is sorted out into various kinds and sub-sorted into smaller groups for ease of handling, is a very valuable section of the salvage. Rubber also is given special attention, and glass is stacked in a heap ready to be sent to glass works, where it is re-melted. Each different kind of material is stored in its appropriate dump, and all the dumps are alongside roadways or loading banks, so that an absolute minimum of time is wasted in handling and loading any particular material.

It is a lesson in economy to follow the



Picking out metal, glass and other useful articles from refuse carried on a conveyor belt.

various kinds of scrap material to their final despatch from the works, and to learn the great diversity of uses to which they are put. Rubbish for which its original owners could never have imagined any sort of demand often proves to be the raw material for some other thing that is both familiar and serviceable to everyone.

The quantity of refuse received each day is considerable, but so rapidly and expeditiously is it handled that only a few hours elapse between the arrival and tipping of the refuse collection vehicles and the departure of most of the sorted material to places where it can be of further service. Rarely has it been more clearly demonstrated that rubbish is simply "matter in the wrong place."

Locomotive Working in Kenya

By "A Railway Engineer"

WHILE articulated locomotives of the Beyer-Garratt type are being used to an ever-increasing extent on the railways

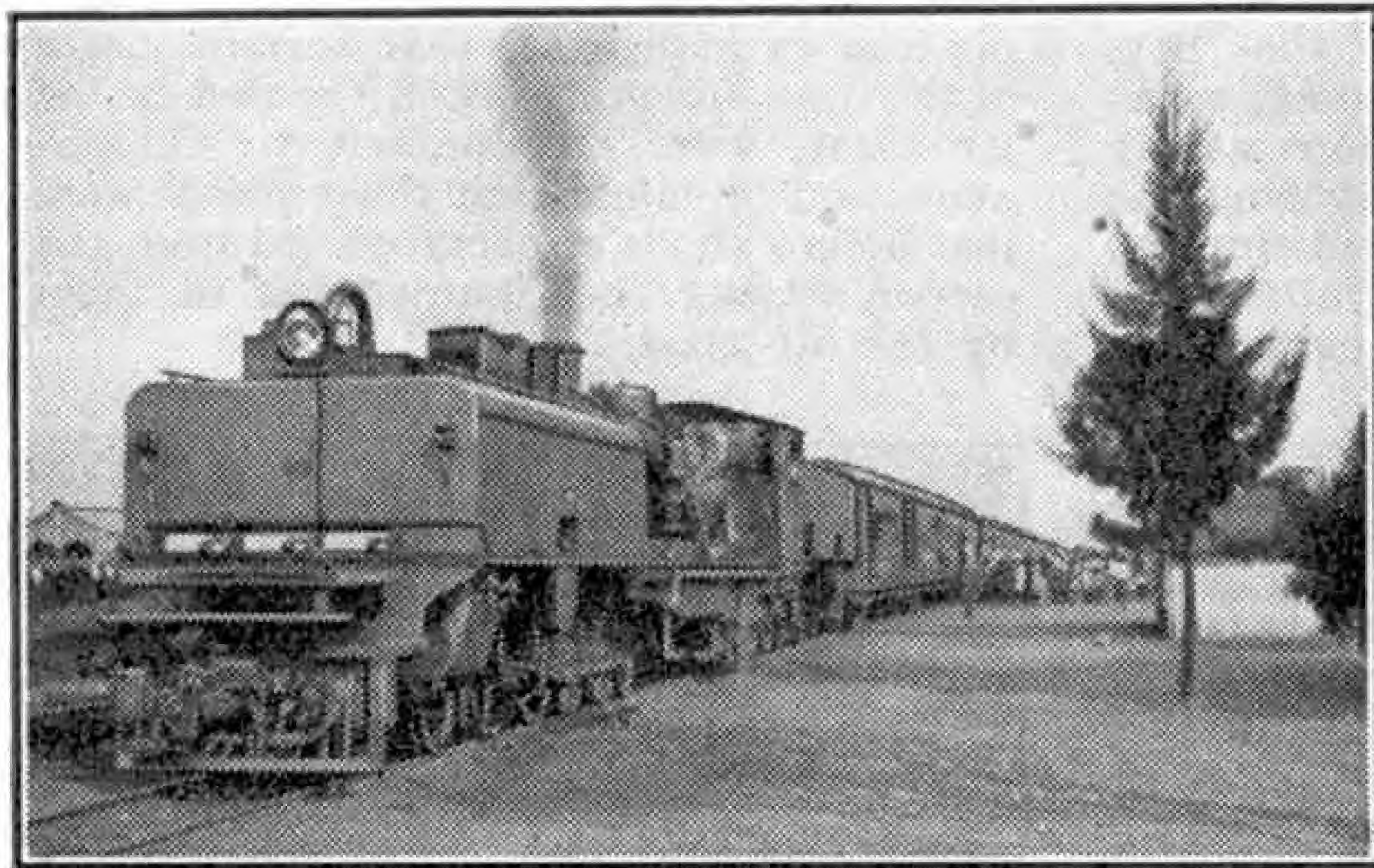
from Nairobi to Mombasa and back. On these turns they are double-manned, on the caboosse system, as widely used in

America; each crew does an eight-hour spell on duty, while the other is resting in the caboosse. The crews usually consist of Indian drivers with African firemen. Six still larger Beyer-Garratt engines having the 4-8-4+4-8-4 wheel arrangement are now in service, making round trips of 1,100 miles, from Nairobi to Kampala and back. These monster machines weigh no less than 186 tons, and yet they are so designed as to have no axle load greater than 12 tons, as against the 20-22 tons common in Great Britain.

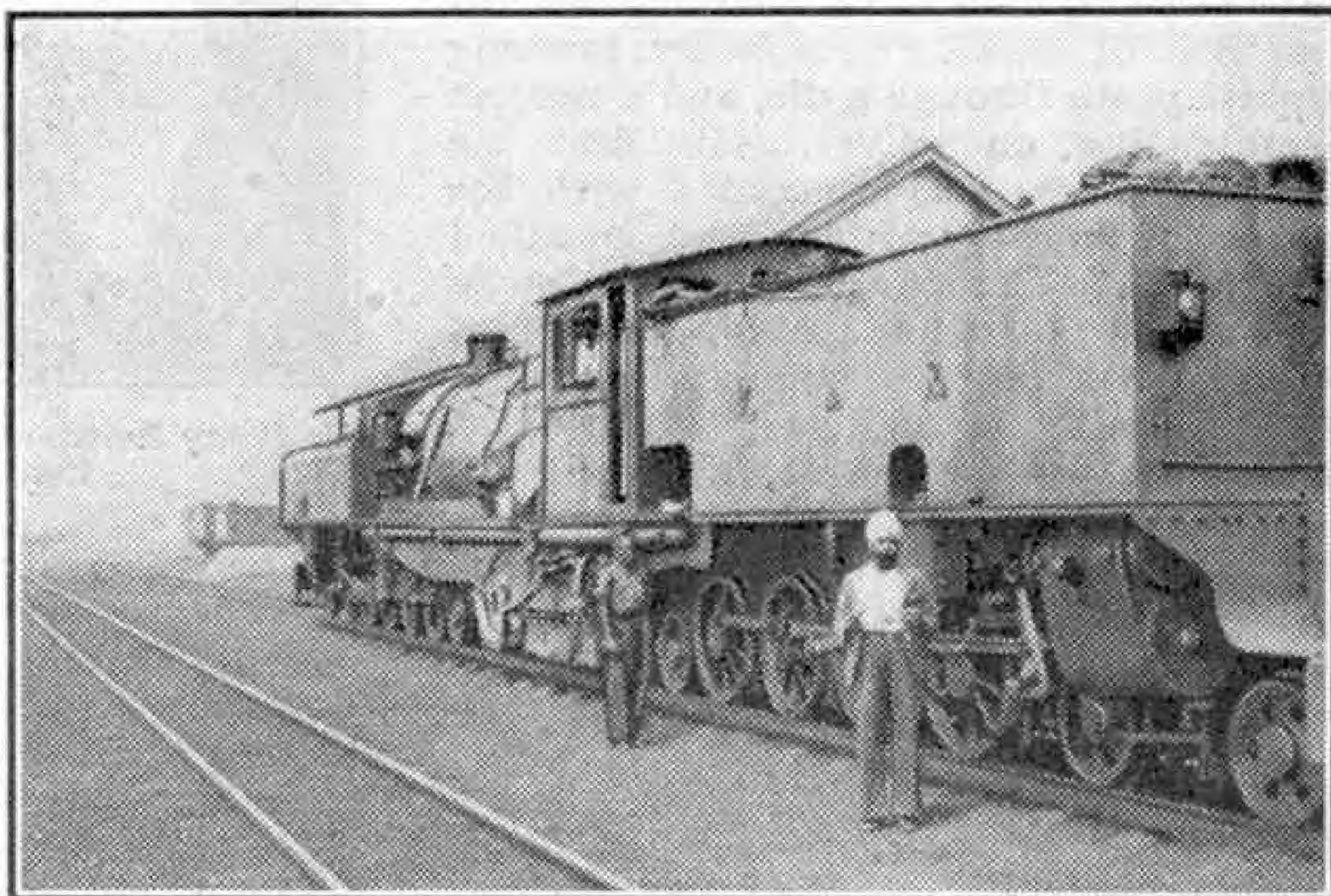
These engines, and the slightly smaller ones illustrated on this page, provide a fine example of the way the Beyer-Garratt principle of articulation can give, to a comparatively lightly built railway, locomotives having the haulage capacity of those on a standard gauge line. The tractive effort of the latest K.U.R. engines is 46,090 lb.

of the Empire, it is rather remarkable to find a system on which two-thirds of the total main-line traffic is worked by engines of this type. Such however is the case on the metre-gauge Kenya and Uganda Railways. Operating conditions are very severe. In addition to the disadvantages arising from a narrow gauge, and from track laid with rails weighing only 50 lb. to the yard—as against the 95 lb. usual in this country, the gradients are very steep, and in the course of the 879-mile run from Mombasa, on the sea, to Kampala, the line rises to an altitude of 9,000 ft. near Equator station. Over this route 36 Beyer-Garratt engines of the 4-8-2+2-8-4 wheel arrangement are working the principal trains, ranging from long freights to the luxuriously appointed mail trains.

Locomotives make round trips of 660 miles,



A 4-8-2+2-8-4 Beyer-Garratt engine hauling the Mombasa-Nairobi mail on the Kenya-Uganda Railways. Photographs by courtesy of Beyer Peacock and Co. Ltd.



Beyer-Garratt of the Kenya-Uganda Railways and its crew (Indian driver and African fireman).

Famous Inventors

Sir Henry Bessemer

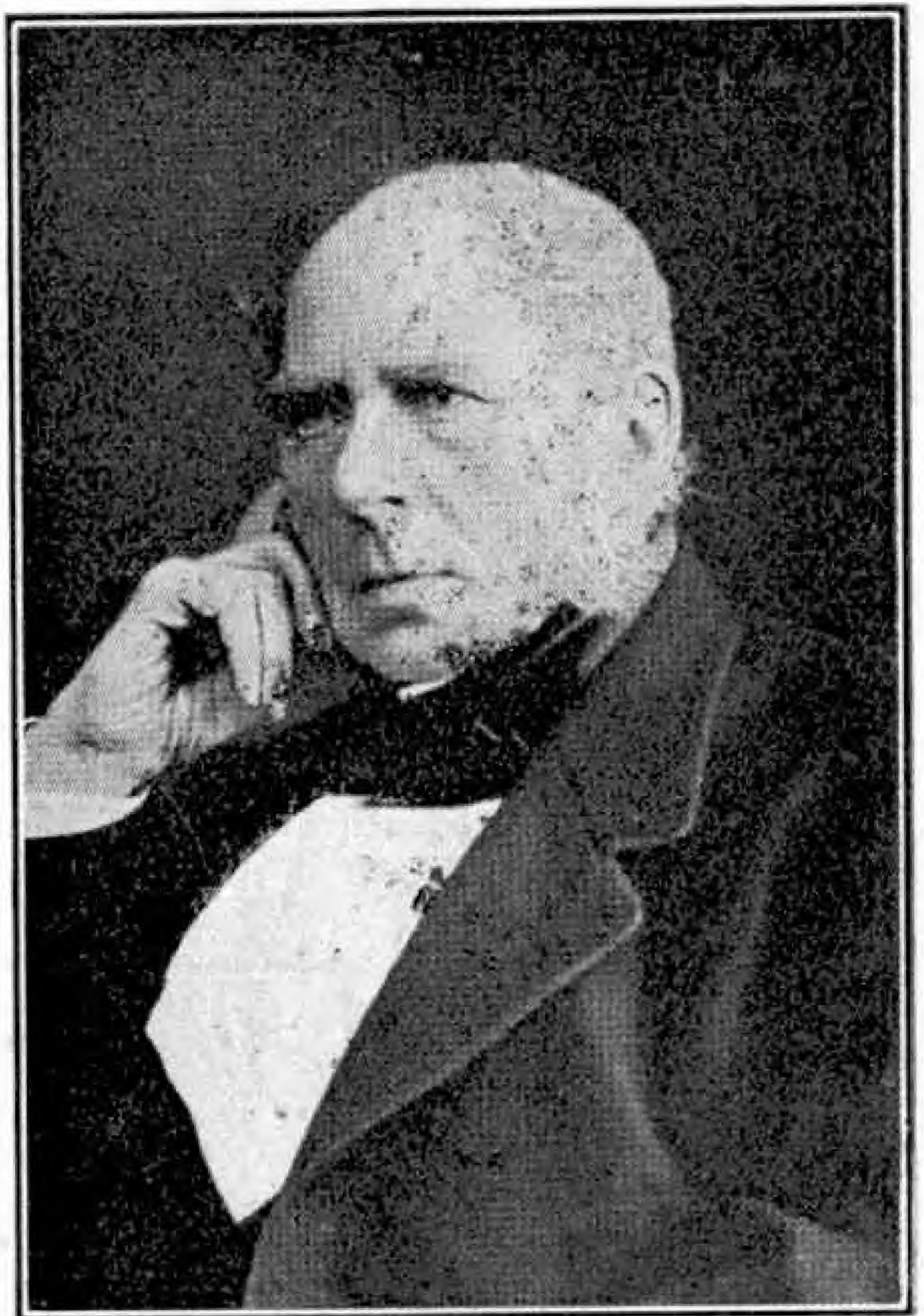
HENRY BESSEMER was born on 19th January 1813 at Charlton, near Hitchin, Herts. His father, who was of Huguenot descent, had established there a type-founding business, and the boy, while attending the village school, spent all his spare time in the workshops asking endless questions about everything he saw. It was evident that he had unusual mechanical ability and his father encouraged him to develop it in every way.

At the age of 17 Bessemer went to London and struck out for himself. He was greatly interested in the production of white metal castings of works of art, ranging from statues to small ornaments, and he soon established a flourishing business. At this time the Government were greatly worried at the heavy loss resulting from the fraudulent re-use of revenue stamps on deeds. Bessemer saved the situation by means of his first invention, a perforated die that impressed a date on each stamp. It was admitted that this invention saved the authorities something like £100,000 a year and Bessemer was promised a good official appointment in return, but the promise was never kept.

Other inventions followed rapidly. Turning his attention once more to type-founding, he produced a type-composing machine from which the modern linotype may be said to have developed. He devised a method of making pencils by pressing graphite paste through a die, and a process of embossing on velvet. His first big financial success was concerned with the making of bronze powder and so-called "gold paint." This powder was then made in Germany by hand labour and cost about £5 10s. 0d. per pound. Bessemer, after a series of failures, invented a machine to do the work, and put his products on the market at £4 per pound; later he was able to reduce the price to half-a-crown per pound! This venture brought him in a large sum of money that was to set him on the way to his success in steel manufacture.

The Crimean War had shown the inefficiency of the British artillery, and Bessemer set himself to improve the construction of the cannon by producing a metal better able to withstand the

firing strain. He first tried a fused mixture of cast iron with steel, but this was no improvement. Continuing his experiments, he noticed one day, while melting pig-iron in a furnace, that certain pieces of the iron, which had been exposed to the air blast, were still unmelted. On examination he found that these pieces were just hollow shells of decarbonised iron, the carbon having been burned out of them by the air blast.



Sir Henry Bessemer. Photograph by courtesy of The Iron and Steel Institute.

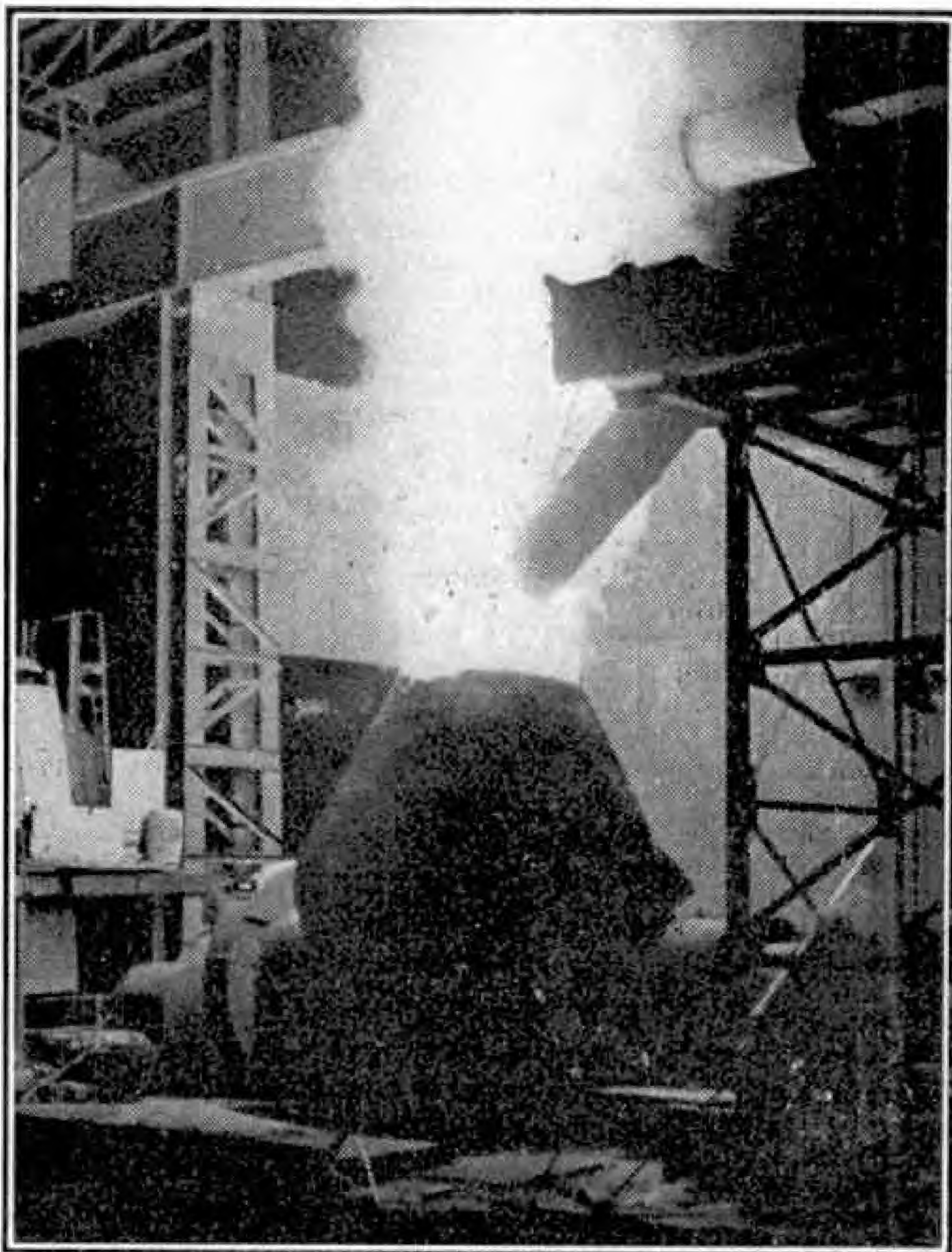
This gave him the idea that it might be possible to free pig-iron from carbon, which was the cause of its weakness. He devised a special furnace into which molten pig-iron from the blast-furnace was run and then subjected to a stream of air or steam under pressure. He patented his method, but soon found that there were many difficulties to overcome. The greatest trouble was that it was impossible to tell

exactly when the impurities in the iron had been removed. Often the air blast was continued too long, with the result that the iron was ruined.

Bessemer now produced his famous converter. This consisted of a pear-shaped vessel in the bottom of which were passages by which a blast of air could be passed through the molten iron. The vessel was mounted on trunnions so that it could be swung into either a horizontal or a vertical position, the movement being controlled by hydraulic mechanism. The converter, in the horizontal position, was charged with molten pig-iron. The air blast was turned on, the converter was swung upright, and the molten mass began to "boil." The oxygen in the blast combined with the impurities in the iron, which were burned away. During this time a fierce flame issued from the neck of the converter. At first this flame was pale, but it rapidly grew brighter until it became intensely brilliant. Presently the flame died down, indicating that the process was complete. The converter was then swung down on to its side and the blast was shut off.

The steel thus produced was still unsatisfactory, however. Good steel must contain a certain amount of carbon, and the converter removed either too little or too much. The problem was solved by the adoption of a scheme put forward by a Scotsman named Robert Mushet. His idea was to drive out in the converter practically the whole of the carbon, and then add to the molten metal exactly the amount of carbon required to make steel of the desired quality. The carbon was added in the form of "spiegeleisen," or mirror-iron, which contained known quantities of carbon and manganese. This iron gets its name from the fact that when broken it forms crystalline plates of very brilliant appearance. The idea worked well, and through it the success of Bessemer's method was assured.

Bessemer's contribution to steel manufacture brought him a great deal of money so that he was able to retire; but his inventive brain could not remain idle for long. He was a severe sufferer from sea-sickness, and he set to work to find a remedy for the discomfort of the Channel crossing. This took the form of the steamship "*Bessemer*," launched at Hull in 1874. The notable feature of this vessel was a



Bessemer Converter in process of "Blowing." Photograph by courtesy of The United Steel Companies Ltd.

saloon supported on trunnions and controlled by hydraulic apparatus, the idea being that, no matter how the ship rolled, the saloon would remain level. In theory the scheme was excellent, in practice it was not a success. This was an unfortunate ship. She proved extremely difficult to handle and twice collided with the pier at Calais. Bessemer was very emphatic that these mishaps were not in any way connected with his anti-rolling device, but the attempt was abandoned and the ship was sold for a very small sum. It is interesting to note that the "*Bessemer*" had four paddle wheels, two on each side. The idea was not successful, however, because the two after paddles revolved in water that was already being driven astern by the forward pair, and so were ineffective.

During his remaining years in retirement Bessemer interested himself in building astronomical telescopes. He also constructed a diamond-cutting plant and a furnace fitted with mirrors to utilise the heat of the Sun. He was knighted in 1879, and received many honours from engineering and scientific societies. He died at Denmark Hill on 15th March 1898, at the age of 85.

Air News

The "Typhoon" and "Whirlwind" Fighters

One of the Hawker "Typhoon" single-seater fighters now being delivered to Royal Air Force squadrons was flown recently by Capt. H. H. Balfour, Under-Secretary of State for Air. This fine low wing machine is fitted with the new Napier "Sabre" liquid-cooled engine which develops 2,350 h.p. for take-off and gives the machine a top speed of rather more than 400 m.p.h. It may be armed with either machine guns or shell-firing cannon, or both, and is said to be one of the most heavily armed and armoured machines in production. It is known to have a greater range than the famous "Spitfire" and "Hurricane" fighters.

The Westland "Whirlwind" is a bigger but less speedy single-seater fighter. It was first flown at least a year before war broke out, but the publication of details of it has only just become permissible. It is a twin-engined machine with two 860 h.p. Rolls-Royce "Peregrine" engines, and is believed to have a top speed of about 350 m.p.h. The "Whirlwind" is both a day and night fighter, and for night work it has retractable landing lights under the wings, and muffs over the exhausts to damp the exhaust flames. Fowler type flaps are fitted to the trailing edges of the wings, and the rear part of the engine nacelles are hinged to move with the flaps. The undercarriage and tail wheels are retractable.

Qantas Empire Airways Complete 21 Years of Operation

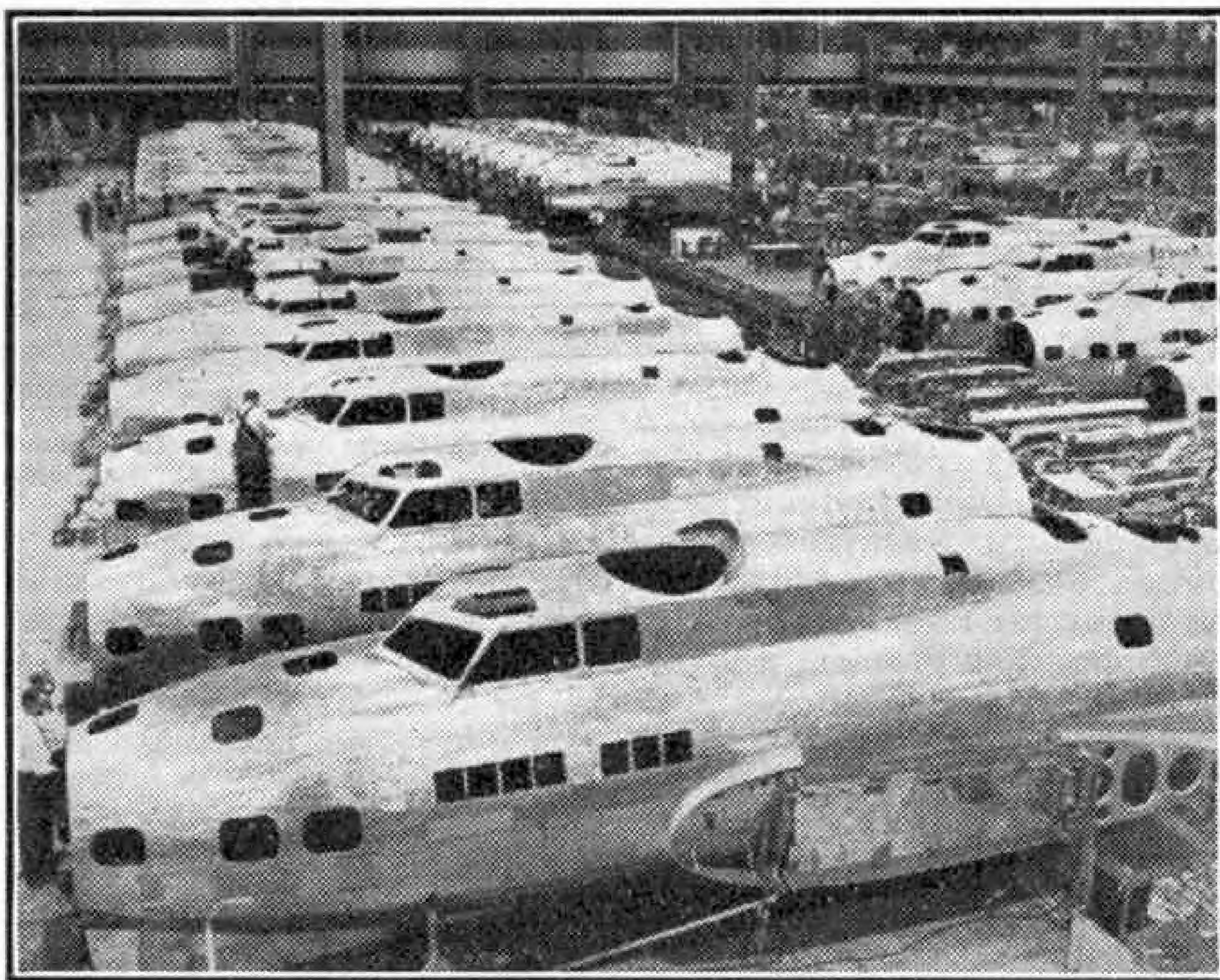
The Australian air transport company now known as Qantas Empire Airways recently completed 21 years of operation. Throughout that eventful period they have had the same Chairman and the same Managing Director. In 1919 the Federal Government commissioned Lieuts. Hudson Fysh (the present Managing Director of the company) and P. J. McGinniss to survey the Darwin-Brisbane air route, and the following year a company was formed under the title of "Queensland and Northern Territory Aerial Services Limited," with Sir Fergus McMaster as Chairman (Sir Fergus is Chairman of Q.E.A.). The company began work with two war-type single-engined biplanes which cruised at about 65 m.p.h., and Hudson Fysh and McGinniss were the pilots.

The first air service operated by the company was between Charleville and Cloncurry, a distance of 577 miles, and was introduced in 1922. From this small beginning the company gradually extended their activities as better and larger aircraft became available and more services were established, and the first 1,000,000 miles of flying was completed by 1930. The next year the first link with Imperial Airways was established, when the Qantas company assisted in carrying the first experimental official air mails

between Australia and England. In 1934 the company were registered under their present name, and a year later took over the operation of the Singapore-Darwin section of the England-Australia air route, now temporarily interrupted by enemy action in that part of the world. Another important event in the company's history was the introduction of the Australia-New Zealand air service by the newly-formed Tasman Empire Airways in 1940.

World's Largest Flying Boat

Some details are available of the world's largest flying boat, built by the Glenn L. Martin Company, of Baltimore, U.S.A., for the U.S. Navy. This great boat has a wing span of 200 ft., is 170 ft. long, and its loaded weight is 62½ tons. It has four 2,200 h.p. Wright "Duplex-Cyclone" engines, and a top speed of at least 200 m.p.h. Exact details of its armament have not been issued, but it is known to have six power-operated gun turrets.

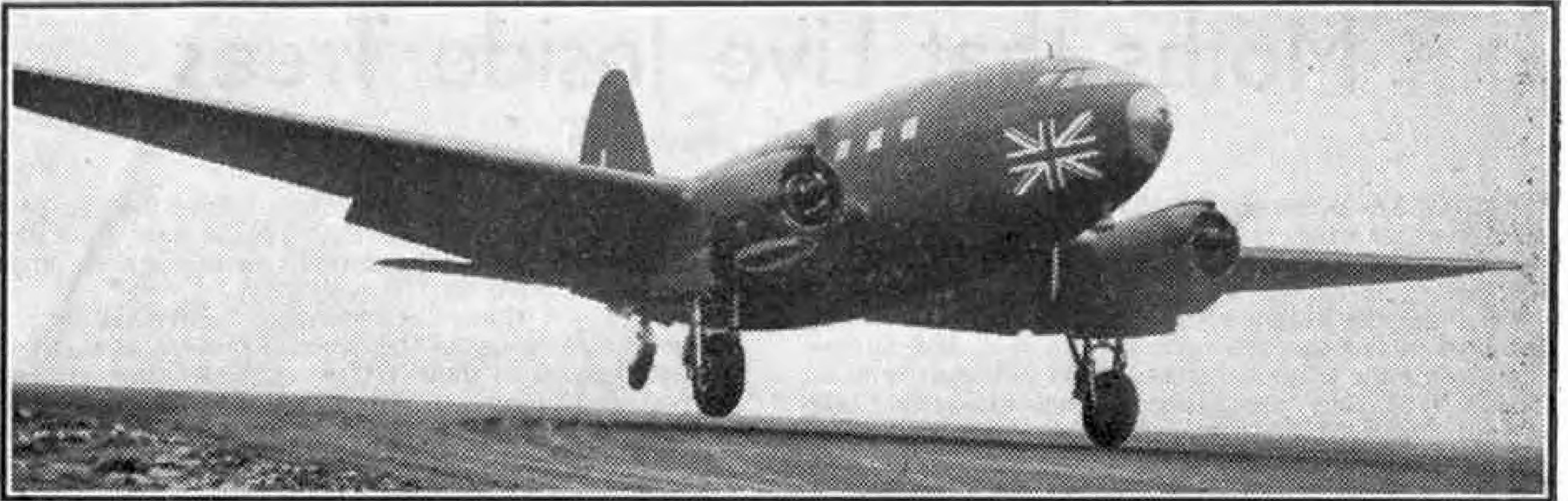


Wartime quantity production of "Flying Fortress" heavy bombers in the Seattle, U.S.A., plant of the Boeing Aircraft Company, by whose courtesy this photograph is reproduced.

The 2-deck hull is a massive structure, and its total volume is equivalent to that of a 15-roomed house. There is sleeping accommodation for a crew of 13 men, but normally only 11 will be carried. If used as a troop transport the flying boat could carry 150 fully equipped marines.

C.P.R. Air Line Developments

The Canadian Pacific Railway have acquired 10 Canadian air transport firms, and by this step, control of a vast network of important air lines in the Dominion. The air services of the C.P.R. are now being re-organised into three huge districts, which have been named the Western, Central, and Eastern respectively. The headquarters of the Western district is at Edmonton, and that of the Central at Winnipeg. The location of the Eastern district headquarters has not yet been announced.



The world's largest twin-engined landplane, the Curtiss C.W.20 of British Airways. A special article on this big twin-engined air liner appears on page 137.

New German Bomber

A new type of German bomber, the Dornier Do 217E, recently made its first appearance over this country, and since then several of these aircraft have been brought down by Britain's air defences. The lower illustration on this page shows one of these crashed machines.

The Do 217E rather resembles the Dornier Do 17Z and Do 215 in general appearance, but it can carry a much greater load, has a longer range and a better performance than those types. This is largely due to its two exceptionally "beefy" engines, which are 14-cylinder radials of the new B.M.W. 801 type, each developing 1,480 h.p. at 14,700 ft., and boosted to about 1,600 h.p. for take-off. The engines are fitted with fans for cooling, and have an unorthodox exhaust system. The machine examined had a new type of 3-bladed wooden airscrew.

The wing span of this new German bomber is about 72 ft. There are some new arrangements of armour plate in the machine, including a piece to protect the dinghy, and a slab on the top of the fuselage just behind the cockpit.

The Do 217E is obviously intended to do other jobs in addition to bombing. Its speed would make it suitable for long range reconnaissance, and perhaps it was with this in mind that the designers made provision for various combinations of bomb load and defensive and offensive armaments, including heavy calibre machine guns.

An R.A.F. Belgian Fighter Squadron

Belgium is now represented in the Royal Air Force by the first all-Belgian fighter squadron. It is equipped with "Spitfire" Va machines, and has taken up operational duties with the Fighter Command. In February last M. Camille Gutt, Minister for National Defence in the Belgian Government in London, visited the squadron and presented a regimental flag that had been given to one of the original Belgian air squadrons by King Albert. Since May 1940 until recently this flag had remained hidden in a shell case in a Belgian wood. A few weeks ago two Belgian officers were entrusted with the very dangerous task of getting the flag to England, and they succeeded. After the presentation an aerobatic display was given by a Belgian pilot and formation fly-pasts by the squadron.

Papers into Aircraft

The copy of your daily newspaper may be made to help an air crew to fly! When you are asked to add your newspapers to Britain's salvage store you are adding not only to the number of our shell cases but you are also helping to supply a vital material used in constructing a most up-to-date type of trainer aircraft for the R.A.F. The main struts—the skeleton of this machine—are made of compressed laminated wood; and layers of newspaper are inserted to enable the wooden parts—stronger, for their weight than steel—to be divided easily. Paper helps to give the aeroplane greater lightness and strength. Save your newspapers, they are aeroplanes in the making.

Day Dream

A party of A.T.C. Cadets was visiting a nearby R.A.F. station to which they are affiliated. They had a grand time inspecting the big bombers, looking over the workshops, examining the guns, talking to some of the pilots and crews, and generally being in touch, for a few hours, with the real thing.



A German Dornier Do 217E twin-engined bomber recently brought down in this country.

Then, at the roll call before departure, one cadet, the "baby" of the party, was missing. A frantic search followed, with worried officers and N.C.Os. muttering about "little rascals who were a darned sight too keen." At last the "little rascal" was found in one of the big bombers they had been inspecting. His hands firmly grasping the controls, he was fast asleep—dreaming!

Moths that Live Inside Trees

By L. Hugh Newman

THERE are many moths that you never see in the caterpillar stage at all, because they spend this part of their lives in the "galleries" they make for themselves in young shoots of trees and bushes, or lying along the hollow stems of plants. The Goat and Leopard moths go even further than this, and burrow right inside the trunks of trees. Many of these "internal feeders," as they are called by entomologists, take several years to mature; and as they often live in colonies they do a great deal of damage to growing timber, and in wartime are definitely classified as economic pests.

In Australia this group of insects is represented by the swifts (*Hepialidae*), which attain gigantic proportions, like nightmare visions of the common garden swift moths in this country. When one considers the enormous size some species of trees grow to in the Commonwealth, it is not really so surprising that the insects which live on them should also be large. The largest moth is *Leto stacyi*, which infests the eucalyptus trees in New South Wales. The caterpillars are about six inches long, and the wing span of the moths averages ten inches. The insect is a handsome creature, with yellowish-brown fore-wings and white "eye" spots with black crescents. Some members of this family are green or blue, flecked with silver spots, others are just dull grey; but all have the characteristic long, rather coarse body.

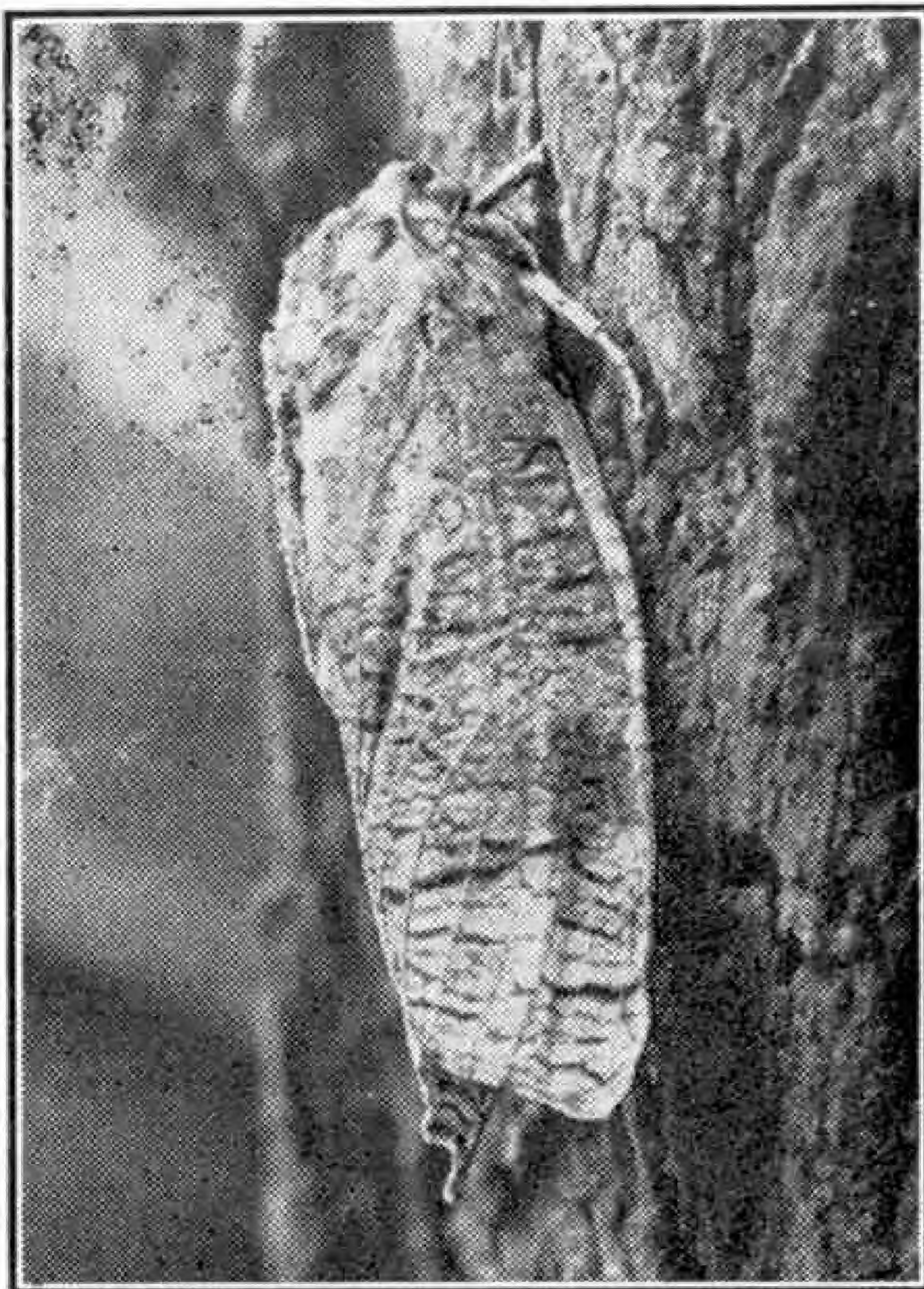
Among our own "invisible caterpillars" the Goat moth has the most curious life history of all the British tree-boring larvæ. After spending almost three years as a caterpillar it leaves the tree it has pitted with its tunnelling, and in the autumn of the third year makes a rough earthen cocoon near the base of the trunk, or sometimes a chip cocoon in the rotting tree itself. But unlike most caterpillars that make cocoons, it does not turn into the pupa inside at once, but merely goes into hibernation for the winter months. In the spring it wakes up again, eats its way out of its temporary cocoon, and starts to crawl around in search of a suitable place in which to pupate properly. It is during this "walking tour of inspection" that you may chance to see one of these Goat moth caterpillars. They are extremely fierce-looking creatures with strong jaws that look as though they would give you a nasty nip if you handled them; but their rather revolting colour, a pale unhealthy fleshy tint on the underside, and a raw beef steak colour along the back, is sufficient to deter most people. Although I have handled quite a number I cannot say that I have ever been bitten!

The Leopard moth only spends two years in the larval stage, but as the caterpillars show a preference for fruit trees, they are an even more serious economic pest when they occur in numbers. In old orchards one may often see old pear trees gnarled and stunted by their ravaging for many generations. Farmers usually resort to fire to drive them out, lighting a smoky bonfire at the base of the hollow trunk, and then stamping on the caterpillars as they crawl away from the fumes and heat.

These Leopards are also a garden pest, and may spread from the fruit trees to your choicest lilac bushes. As they bore into the stems at night time and are hardly ever seen during the day, the damage is done before you realise it; and if the larvæ have established themselves up the main stem of the bush it is often impossible to save it except by drastic pruning. But the moths can be seen on the wing in July, and in normal times they make straight for the first street lamp they see after they have dried their wings. They seem particularly susceptible to strong light, perhaps because the caterpillars live in almost perpetual darkness. As there are no street lamps now, I suggest you look on the tree-trunks in

your garden early in the morning, before the sun gets round and disturbs the moths. This is how I got the photograph of the Leopard moth in my garden, that you see illustrated on the next page.

Personally I think the clearwing family are by far the most interesting of the internal feeders, as so little is really known of their habits. Actually they are not clear-winged insects at all, on first emerging from the pupa, but like all other moths their wings are covered with thousands of minute scales. But immediately they make their first flight all the scales fall off except for a narrow border round the edges of the wings. There are fifteen different known species in this country, and as many of them have gaily-coloured



A Goat Moth on the trunk of an elm. In the caterpillar stage this insect spends three years in a tunnel in a tree.

stripes round their bodies they are not difficult to distinguish when you have once learnt the different colour schemes.

Only two of them do any serious damage, the currant clearwing, *Sesia tipuliformis*, and the apple clearwing, *Smyopiformis*. As I have currant clearwings in my own garden, I have been able to watch their development from the egg to the perfect insect, by cutting open infested branches during various stages in their life history. The female clearwing lays her eggs on the leaves or young shoots of the currant bush. On hatching, the tiny larvæ at once begin to bore into the stem nearest them. They do not start to feed properly until they have reached the centre, as their food is the pith, and this nourishes them until they are fully grown.

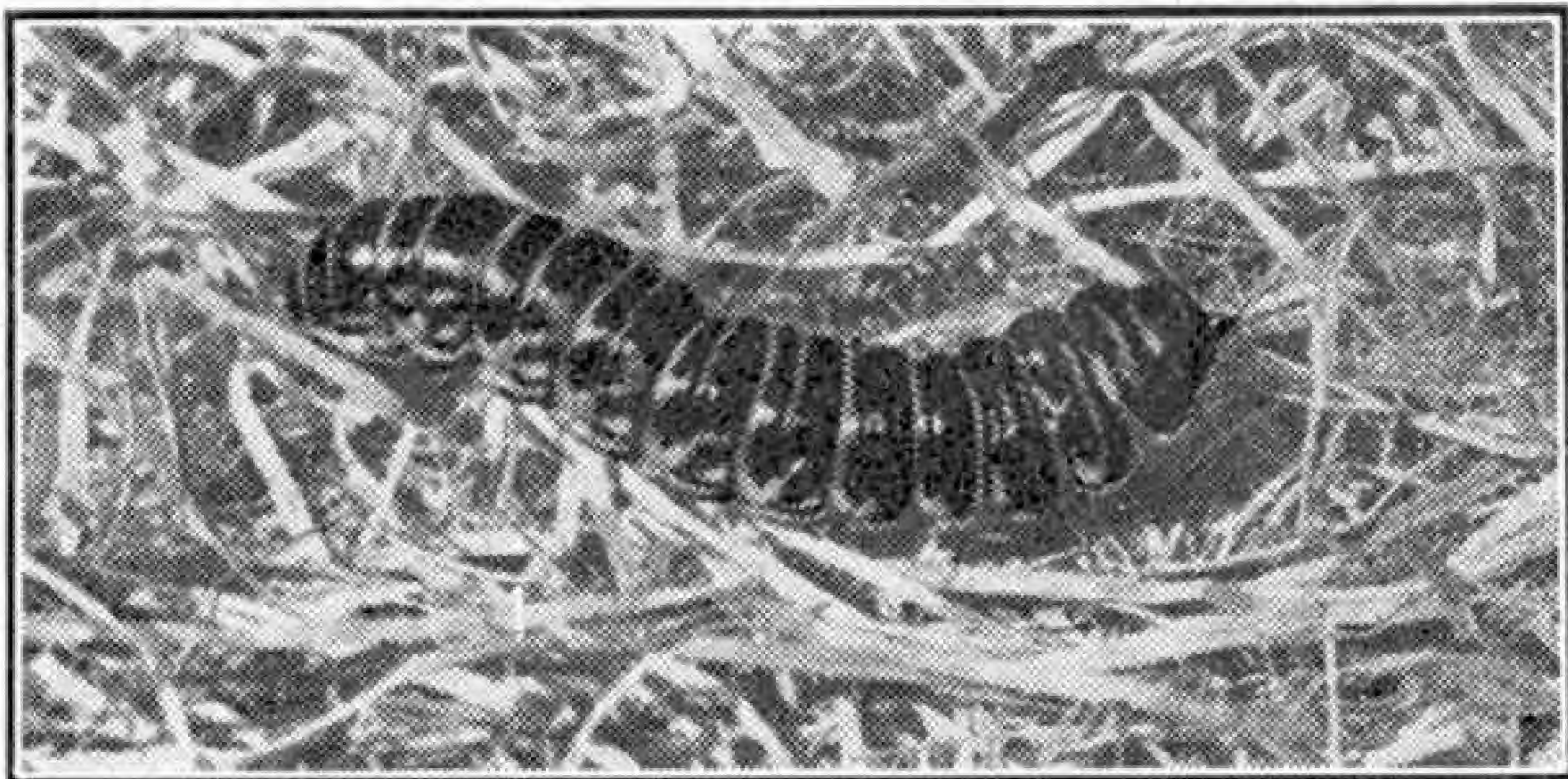
Before turning into the pupa the larva burrows almost to the surface again, but is careful not to

break the outer layer of the bark. It leaves a thin filament, which in reality is a miniature cap sealing the hole it has bored. The caterpillar then returns to the centre of the stem, down the burrow it has made, and soon changes into a pupa. It is not apparent what all this preparation is for until the period of incubation in the pupa is almost due to end. With a great deal of wriggling, using the small hooks on the tail end of its case to support itself, the pupa works its way up the burrow so carefully prepared by the caterpillar. Eventually it reaches the top, and pushing the thin filament of bark aside, it bursts through to daylight. At the same moment the moth emerges from the pupa case, which is left protruding about a quarter of an inch out of the stem. The branch that has been the home of this insect from its earliest stages soon withers, and by the following Spring is usually dead.

Quite a lot of fun can be had searching for the rarer clearwings. If you know of a wood where birch trees have been cut down within the last few years, you may be able to find *S.culiciformis*, the birch clearwing. One of the signs of their presence is when the young shoots growing from the old stumps are bent over, or even lying on the ground. The larvæ boring up the stems have so weakened the shoots that they get blown over by the wind, and if you examine them you will see where the pith has been hollowed out and rotting has set in. Higher up, the larvæ will be still feeding, and if you take the stem home and keep it alive by planting it in moist sand, a moth will eventually emerge. There is often quite a colony of feeding larvæ in the stump itself, and the only way to breed out the moths from

this is to saw off the entire stump, close to the ground level, and then keep it in a large breeding cage.

The oak clearwing, *S.evniipiformis*, is easier to remove, as the larvæ feed between the bark and the solid wood of the tree. Again, they are only found in the old stumps of trees that have been cut down a



The caterpillar of the Goat moth on a "walking tour" before burrowing to make its final cocoon.

few years previously.

It was not so very long ago that only two or three specimens of the orange-tail clearwing, *S.andreniformis*, were known to collectors. And then one day the Hon. Charles Rothschild, brother of the late Lord Rothschild, and an equally keen naturalist, came to my father with a twig of *Viburnum* (the wayfaring tree) in which there was a little round cap, similar to the kind currant clearwings make when they are in the larval stage.

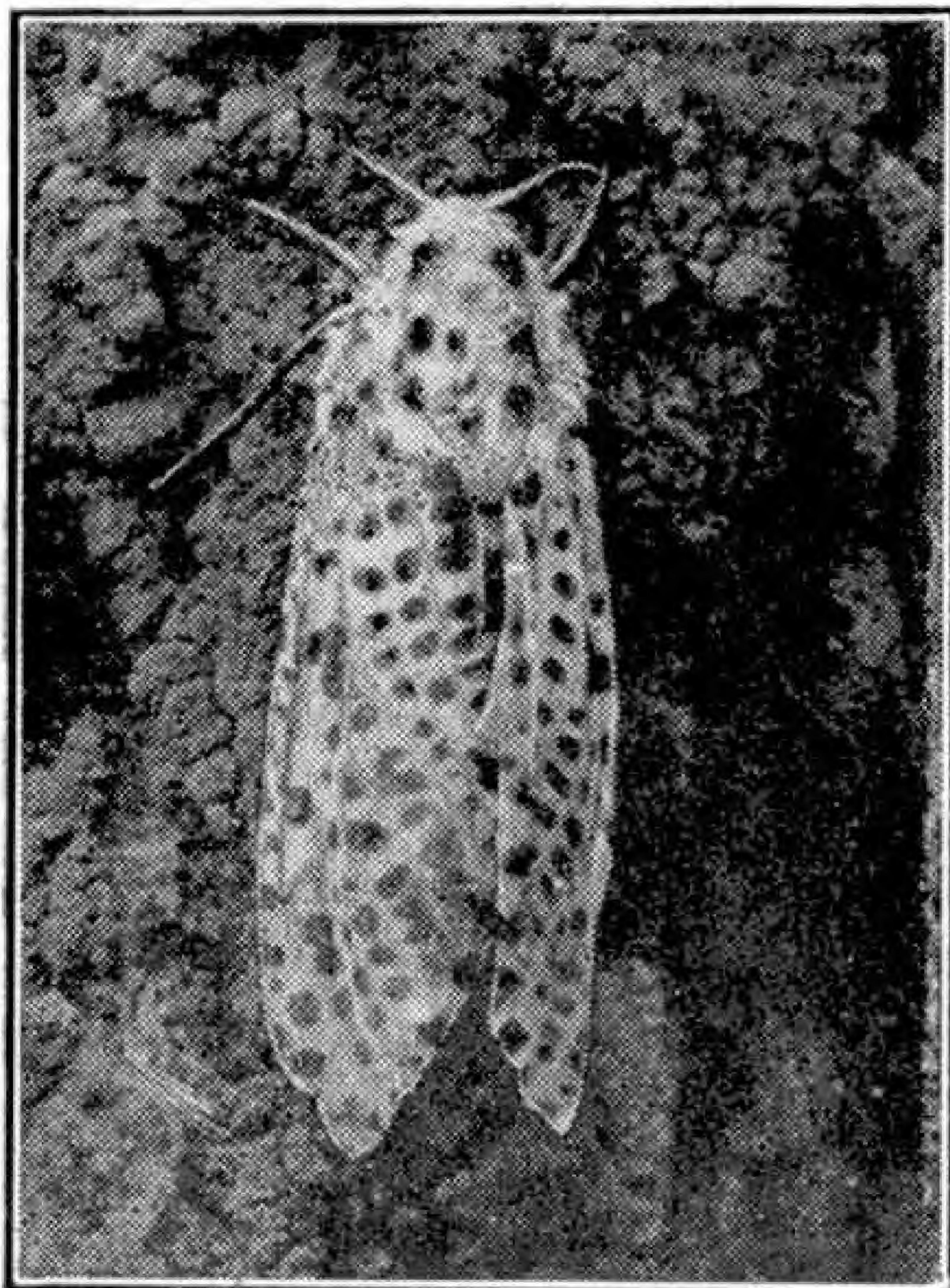
The following day my father set off on his bicycle for a tour of his favourite Kentish lanes. He returned in the evening with 156 twigs of *Viburnum* in his satchel, and in due course each one produced a perfect insect. Since then another clearwing has been discovered in the stems of sallow bushes, and has been named *S.flaviventris*. Clearwings can be found also in Lombardy and black poplars, aspen, willow, alder, and in the roots of ash. The hornet clearwing of the poplar, *T.apiformis*, is a very wonderful mimic of the common hornet, *Vespa Crabro*. The markings on the body are very similar and both have transparent wings; but if you look at the head you will notice that the hornet has a typical "waspish" head, whereas the hornet clearwing has a moth's head with long tapering antennæ.

Actually all the members of the clearwing family remind one much more of flies than of moths, so next time you see what appears to be a fly with a gaily striped body, examine it carefully, and you may find that it is one of the clearwings.

I hope I have not given the impression that the clearwings are rare moths, because most of them are really quite common, and the following true story will bear this out.

A few years ago a local farmer came to see my father at his "Butterfly Farm" and asked him if he could help him to devise a plan to rid his soft fruit plantations of the currant clearwing moths.

Early the following Spring my father visited the plantation with the farmer, cut out a number of the clearwings from the infected bushes, and took the shoots home with him and put them in trays of damp sand, so that they would continue to live and nourish the caterpillars inside. A few weeks before they were due to emerge my father moved the trays into a heated greenhouse, and the moths began to emerge about a week earlier than they do normally out of doors. The males emerged first, and a few days later the females began to appear. All the females he kept apart, each in a separate box, and when he thought he had enough, about twenty altogether, he took them to the plantation and dotted them about (Continued on page 158)



A Leopard moth on the stem of a pear tree. The Leopard moth caterpillar burrow for preference into the trunks of fruit trees and the stems of lilac bushes.

BOOKS TO READ

Here we review books of interest and of use to readers of the "M.M." With the exception of those issued by the Scientific and Children's Book Clubs, which are available only to members, we can supply copies of these books to readers who cannot obtain them through the usual channels. Order from Book Dept., Meccano Limited, Binns Road, Liverpool 13, adding 6d. for postage.

"THE FIRST PASSENGER RAILWAY"

By CHARLES E. LEE

(Railway Publishing Co. Ltd. 5/- net)

It may surprise some of our readers to know that the first railway in the world on which a regular passenger service was run is still in existence as an independent concern. This is the Swansea and Mumbles Railway, and its story is here told in a most interesting manner.

The Mumbles Railway, as it is known locally, has seen many changes in its long career. To-day it has many of the characteristics of the street tramway, yet it possesses an automatic electric signalling system. It has in turn been operated by animal traction, steam power and electricity, and at one time horse-drawn cars were used along with trains of tramway-like vehicles hauled by a steam locomotive. The track too has changed. It began as a plateway, with rails consisting of lengths of angle iron supported on stone blocks. The wheels then had no flanges. Later edge rails and flanged wheels of the now usual kind were introduced.

The line was incorporated in 1804, and at first conveyed goods only. Passengers came on the scene in March 1807, when Benjamin French, one of the prominent Swansea men who inaugurated the line, paid for a concession to "run a waggon or waggons . . . for the conveyance of passengers." The concession at first was for a period of a year, but was then renewed, and there is an interesting reference to the line in a diary written in 1809 by Miss Elizabeth Spence and later published. This tells us that the vehicle used "contains twelve persons and is constructed chiefly of iron, its four wheels run on an iron railway by the aid of one horse and is an easy light vehicle." This is believed to be the earliest published reference to a passenger journey by rail. Miss Spence's views were in striking contrast to those of a later traveller who in 1813 asserted that at the rate of five miles an hour the carriage made as much noise as 20 sledge hammers in full play, and that the journey of four miles made a passenger so dizzy and confused that he could scarcely recover in a week!

In addition to the chapters dealing with the historical matter, which are necessarily very full, the book includes detailed references to the type of permanent way used, to the rolling stock and motive power, and to the electrical equipment and automatic signalling arrangements of the present era. The illustrations are good and the index provided makes for ready reference.

The book will appeal to the serious railway reader and is an important contribution to the history of transport by rail.

"ATTACK!"

By LELAND JAMIESON (Harrap 6d. net)

This is a story of the part played by an American aircraft carrier in defeating an attempt by a hostile power to land forces on the Atlantic coast of South America. It is full of thrills, and it is clear that the author has real knowledge both of actual fighting in the air and of the work of an Air Force considered from a general point of view.

In effect the book is the story of a few days in the life of a fighter pilot, who with his comrades takes the air against enemy bombers and fighters. We are with him in both defence and attack, and the ruthlessness of air-fighting and the necessity for speed and decision in all things are driven home very forcibly. There is also a vivid picture of life on board an aircraft carrier, and the reader is made to realise the high standards of courage and intelligence demanded from men of the Fleet Air Arm.

"HOW THE R.A.F. WORKS"

By A. H. NARRACOTT

(Frederick Muller. 5/- net)

Everybody likes to get behind the scenes, and this excellent book provides a real insight into the many and varied activities of the Royal Air Force. Sir Archibald Sinclair, Secretary of State for Air, describes

it in a brief foreword as giving "the essential facts about a multitude of men and machines, from the fighter pilot to the men who sit in target boats waiting to be hit by a practice bomb, and from the latest and largest bombers to the power-driven sewing machines which mend barrage balloons." This is an admirable summary, for the author deals

fully and accurately with the various home and overseas Commands of the R.A.F. Thus the section dealing with the Training Commands explains the intensive training that every man destined for service in the air or on the ground must complete successfully before he can take his place in the R.A.F. The story of the Bomber Command is vividly illustrated by an account of an imaginary visit to a Bomber station, where the reader takes part in the "briefing" of crews for their night's work over enemy territory.

The work and achievements of the Fighter, Coastal and other Commands also are well described, and the splendid chapters on these will add much to the knowledge that "M.M." readers already possess. Other topics dealt with are the air sea rescue services, the anti-aircraft and other ground defences, the work of the Ferry pilots, and the great Empire Air Training Scheme while the Air Training and Royal Observer Corps are not forgotten. There are 16 illustrations.

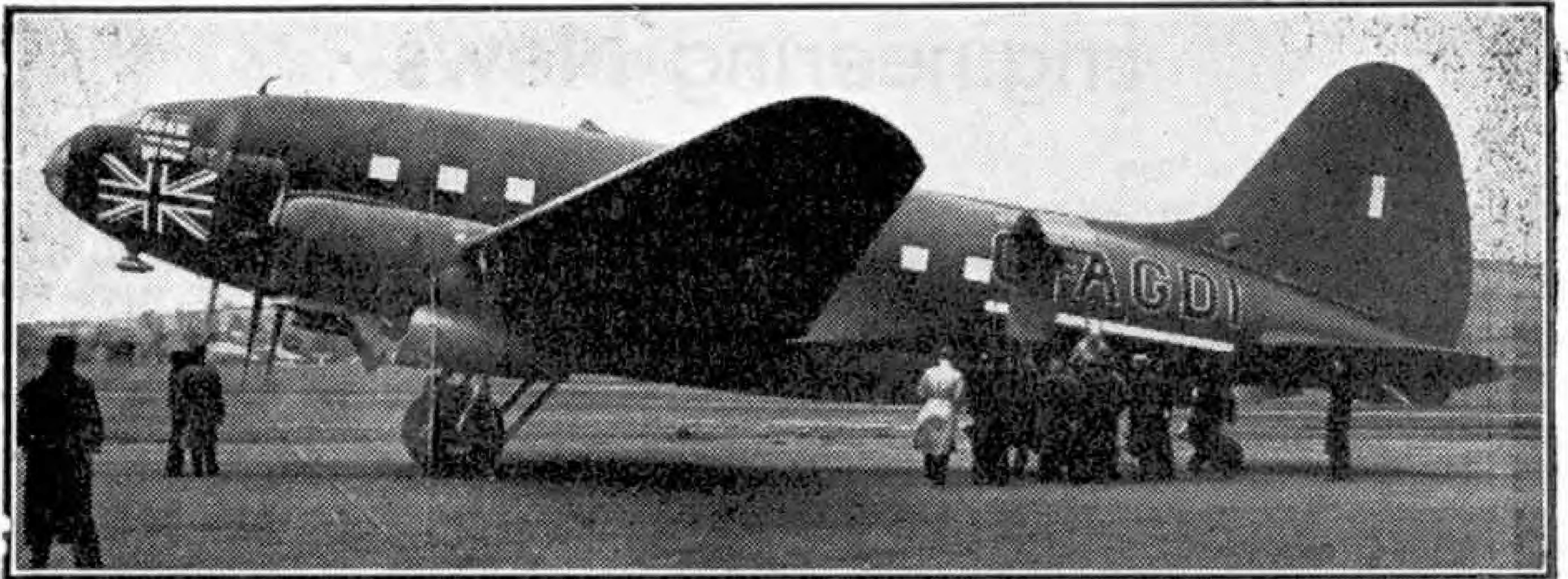
"THE RAILWAY HANDBOOK 1941-1942"

(Railway Publishing Co. 4/-)

The eighth annual edition of "The Railway Handbook" maintains the high level of interest and usefulness set by its predecessors. It is full of information of the greatest interest to railway enthusiasts that it is not easy to obtain from any other single publication at such a low price.

The usual sections dealing with the railways of this country, Northern Ireland and Eire are included. There are tables giving such details as the steepest gradients, greatest altitudes, longest tunnels, largest stations, fastest runs and so on, not only on British railways, but in most cases on systems abroad, together with a mass of information concerning the electrification of steam railways. Special chapters deal with steam, Diesel and electric traction, rolling stock brake systems, permanent way, and the conductor rail arrangements of British electrified railways.

Owing to wartime difficulties, it is impossible to guarantee prompt delivery of books ordered as described at the head of this page, but every effort will be made to ensure speedy despatch.



British Airways' air liner "St. Louis," the largest twin-engined landplane in the world. It was built by the Curtiss-Wright Corporation, U.S.A.

Largest Twin-Engined Landplane

Curtiss-Wright Liner "St. Louis"

THE Curtiss-Wright C.W.20 air liner "St. Louis," the largest twin-engined landplane in the world, is now in the service of the British Overseas Airways Corporation. It was flown across the Atlantic from Newfoundland by Capt. A.C.P. Johnstone, one of the company's pilots, and made the trip in 9 hrs. 40 min.

This fine air liner was designed as an experimental stratosphere aircraft, with special equipment for supercharging the cabin at high altitudes, and was completed and first flown early in 1940. This original form of the machine was described on page 231 of the May 1940 "M.M." The supercharging equipment has now been removed, as British Airways will not operate the machine at heights necessitating the use of such apparatus.

The cabin of the liner is large enough for 36 passengers, but as part of it is now occupied by two 620 gall. extra fuel tanks installed to increase the range of the machine, there is seating only for 24 passengers. Even so, entering the cabin gives one the impression of entering a small cinema. It is about 7 ft. high, and for each passenger there is room to sit comfortably, however long the journey. Certain alterations have been made in the machine since it arrived in this country, including the transfer of the radio equipment from the cabin to a small compartment specially constructed for it just behind the cockpit. A buffet has been fitted in the rear of the 75 ft. long fuselage,

together with an additional lavatory.

One of the most interesting features of the "St. Louis" is the dashboard "tell-tale" in the cockpit. Apparently the most experienced pilot might forget something which should be done, and if so the panel becomes illuminated with reminders. When he presses a button labelled "Take-off," for example, he would see such indications as "Wheel brakes on," or "Fuel tanks off," or "Airscrews coarse pitch," if any of these necessary adjustments had not been attended to.

The "St. Louis" is a low wing all-metal monoplane. At first it had twin fins and rudders, but early in its career these were replaced by a single central fin and rudder. The fuselage cross-section is of unusual shape, outlined by two intersecting circles of which the upper one is the larger. These are joined at their points of intersection by the cabin floor, which thus acts as a 'tie' to withstand internal pressure. The upper, or larger segment forms the passenger cabin, and the lower one is the 550 cu. ft. freight compartment that extends under the cabin floor.

The machine is fitted with two 1,700 h.p. Wright double-row "Cyclone" radial engines, and has a top speed of 243 m.p.h. at 13,000 ft. The cruising speed is 210 m.p.h. at 14,000 ft. At this speed and height, and with 20 passengers and baggage aboard, it has a range of 4,000 miles.

This fine aircraft is a valuable addition to British Airways' fleet.

Engineering News

The "Jeep"

The United States Army authorities claim that the "Jeep," or "Blitz Buggy," their new military motor car, is the most useful vehicle they have ever had. It may be described as a cross between a military staff car and an armoured motor cycle and side-car, and it has been described as the ugliest motor vehicle in the world. In war-time it is performance that counts, however, and it is said that this ungainly vehicle has increased the American Army's transport facilities by 50 per cent. An illustration of it appears on this page.

The "Jeep" has a wheelbase of only 80 in. and a four-wheel-drive that provides enormous traction for its 42 h.p. engine. It was originally designed to replace motor cycles and side-cars for reconnaissance work, and it can go anywhere a motor cycle can and indeed into many places where the latter would be useless. In actual service it can be used to haul light field guns or to carry six fully equipped men, or such weapons as machine guns, anti-tank guns, mortars, etc. It can also serve as a radio car. About the only thing it cannot do is fly, but it has been successfully carried by aeroplane and it is now proposed to experiment in dropping it by a giant parachute. The roughest country does not seem to worry it, and if it should happen to overturn, a few soldiers can set it on its wheels again without strain.

The U.S. Army already has about 5,000 "Jeeps" in service and is planning to equip every infantry regiment in its army with nearly 100 of them. New contracts have just been placed for a further 16,000 of these amazing vehicles with the Ford Motor Company and other well-known firms who built the first batch. Our own army, the Dutch and the Canadians also are experimenting with "Jeeps," and these are already in use in Africa.

Solving a Painting Problem

Engineers responsible for the construction of the Grand Coulee Dam in the United States were faced recently with the problem of drying 11 huge drum gates from the Dam spillway so that they could be painted, perfect dryness being necessary in order to secure a proper bond between the metal and the paint. They solved the problem by employing a process known in the States as "flame priming." Two acetylene generators and a bank of oxygen containers surmounted by a manifold supplied the necessary gases.

Each gate is 28 ft. high and 135 ft. long, and has a total area of approximately 200,000 sq. ft. After drying, the surfaces were scrubbed with wire brushes and treated with a rust preventer before the paint was applied.

100 Years of Mail Service

The Royal Mail Steam Packet Company this year has celebrated the 100th anniversary of its first mail service between Great Britain and the West Indies. The company was first known as the West India Royal Mail Steam Packet Company and was founded

in 1839, the first sailing taking place on 16th December 1841, when the "*Forth*" left Southampton. The actual mail service began on 1st January 1842, however, when the "*Thames*" sailed from Southampton to call at Falmouth for the West Indian mails. The arrangement was that two despatches were to be made each month.

In preparation for its task the company placed what at the time was the largest order for steamships then recorded, the number ordered being 14, six of which were built on the Clyde and four on the Thames. The vessels were described as steam frigates. They were built of wood and were of about 1,800 tons, with engines of about 450 h.p. All were paddle-wheel steamers. Two of them were lost in the first year of service, one off Bermuda and the other at Turks' Island, in the West Indies. Other losses followed, but most of the vessels gave splendid service, some of them surviving until after 1860.

Three of the company's ships, the "*Cheviot*," the



The "Jeep" shows its paces! A description of this interesting military vehicle is given on this page. Photograph by courtesy of Ford Motor Co. Ltd., Dagenham.

"*Tay*" and the "*Medway*," opened a new service to Brazil in 1851, and from this the company's main route of to-day ultimately was developed. The company was closely associated with Southampton, and the earlier dock facilities of that port were largely developed for the use of its vessels.

Training Towers for Parachutists

One of the attractions in the amusement park at the New York World's Fair 1939, were high towers from which people who cared to do so could make a parachute descent. Recently two towers, each 250 ft. high and of riveted steel construction, have been constructed at Fort Benning, to provide initial training of parachutists for the United States Army. Cross arms, each 127 ft. from tip to tip, are fixed to the tops of the towers, one of which provides a free jump and the other a captive jump; the only difference being the use of descending guide cables for the captive jump. The parachutist jumping from the free tower floats down without any fixed control. The parachutist is hoisted to the top of the tower by cable, and the parachute is tripped by an automatic releasing device as it comes into contact with the cross arm at the top.

A sparking plug in which one or both of the electrodes is coated with radioactive material has been invented. It is said to become more efficient with use.



A 16-wheeler girder frame trailer for carrying up to 80 tons. It was built by Cranes (Dereham) Ltd., to whom we are indebted for our illustration.

See-Saw Tipping for Lorry Loads

An unusual but simple and effective method of tipping lorry loads has been developed by Utility Truck Bodies Ltd., Lancaster. In this the body of the lorry is carried on a supporting frame that is attached to the chassis by a hinged joint at the rear. The body itself is designed to slide in guides on its frame, and is moved by means of endless chains operated by hand power. When it is desired to tip the load the body is drawn towards the rear of the chassis, and on passing the point of balance the body and its supporting frame swing over like a see-saw, no power being required to effect the movement.

Two hydraulic cylinders 3 in. in diameter are provided to give control during the tipping motion. These are mounted in the chassis like the rams used for tipping in the more usual type of vehicle, and they can be adjusted to give a range of different tipping speeds. The dampers can be locked so that the body can be stopped and held in any desired position.

At the rear of the body there is a skid that automatically unlocks the tailboard when the ground is reached, so that the load slides gently down as the vehicle draws away. In this manner bricks, packed goods and similar loads are left stacked on the ground almost exactly as they were on the vehicle itself during transit.

New Highways Across Central Africa

An interesting war development is the building of a network of great roads across Free French Central Africa. When the Mediterranean and the Suez Canal route was closed to merchant traffic it became necessary to reach the East by the Cape route, which involves a very long and roundabout journey. Cargoes for the Middle East, however, can now be unloaded on the west coast of Africa and despatched to their destinations over the new roads, which thus form a link in an important supply route for our Forces

in that part of the world.

Altogether about 15,000 miles of new roads have been built in Central Africa, and two of them are highways across the Continent. One commences at Duala, on the West Coast, and ends at a point on the upper waters of the Nile, from which Khartoum to the north and Kenya to the south can easily be reached. The second road reaches Khartoum directly by way of Fort Lamy, near Lake Chad. In addition other roads have been built for northward and southward traffic and the construction of one of these alone involved building 12 tunnels and 92 bridges and viaducts.

Gold Salvaged from a Mined Ship

When the Canadian Australian Lines steamer "Niagara" struck a mine and sank in 438 ft. of water off New Zealand in 1940, she carried to the bottom with her a vast quantity of gold, the property of the Bank of England. For some time it was believed that salvage was impossible, but eventually the United Salvage Syndicate undertook the job and have been successful in recovering gold to the value of £2,379,000. Owing to the depth of water where the ship lay special diving gear designed by Capt. J. P. Williams had to be used.

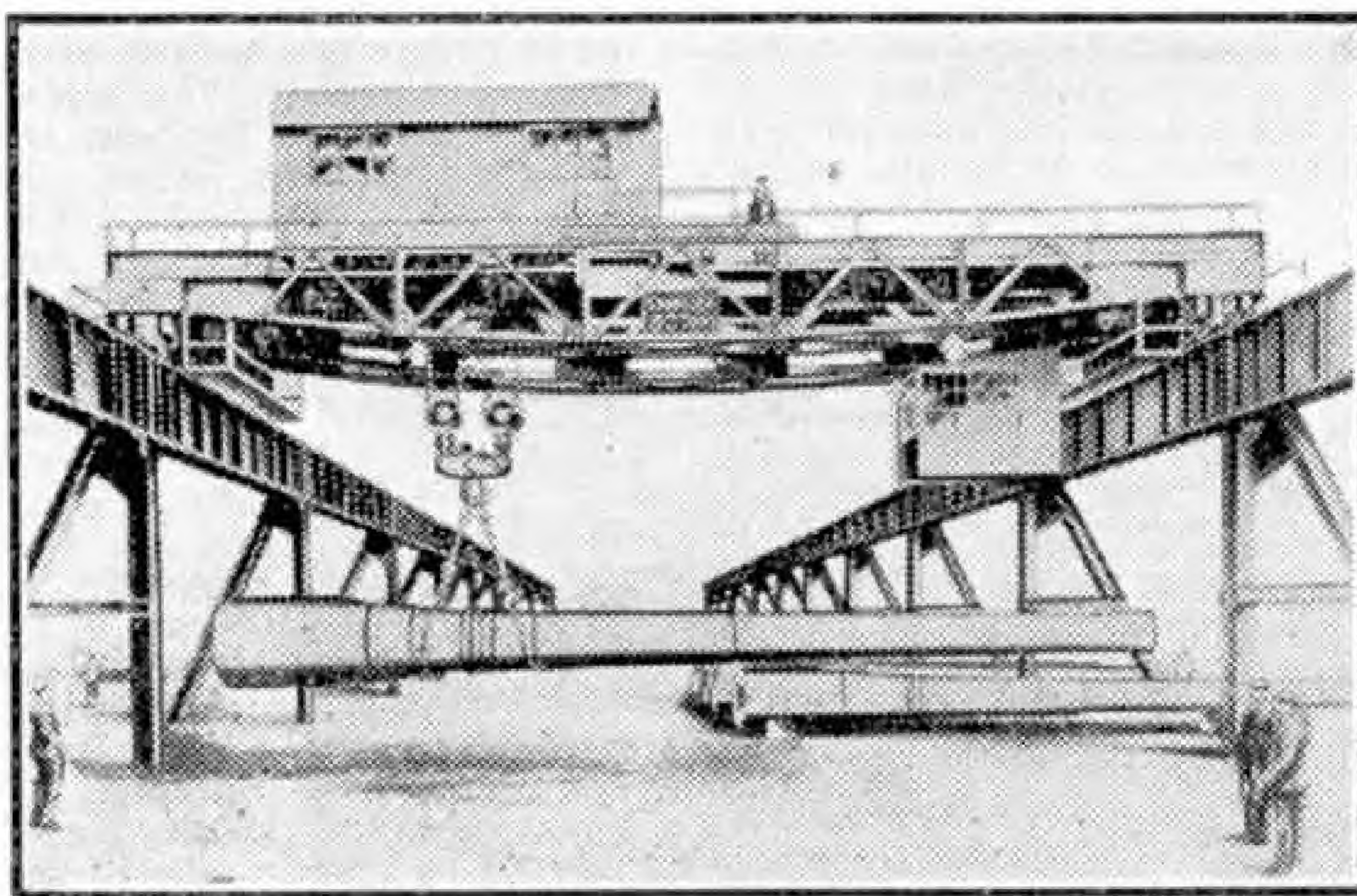
New Danish Cable Ship

The Danish Postal Administration have recently taken into service a new cable laying

vessel, which was built in a Danish shipyard. The ship is 98½ ft. in length, 24 ft. in breadth and 11½ ft. in depth, and can carry 100 tons of cable in her holds. She is propelled by a 220 h.p. motor.

United States Build Another New Dam

A new dam across the Pine River in South-Western Colorado has been completed. It is known as the Vallecito Dam, and its construction has created a reservoir with a maximum surface area of 2,723 acres. It is the 80th water storage reservoir created by the United States Bureau of Reclamation.



A 150-ton four-motor overhead travelling crane at work in a British dockyard. Photograph by courtesy of the Vaughan Crane Co. Ltd., Manchester.

Photography

Better Picture-Making

By J. E. Archbald, A.R.P.S.

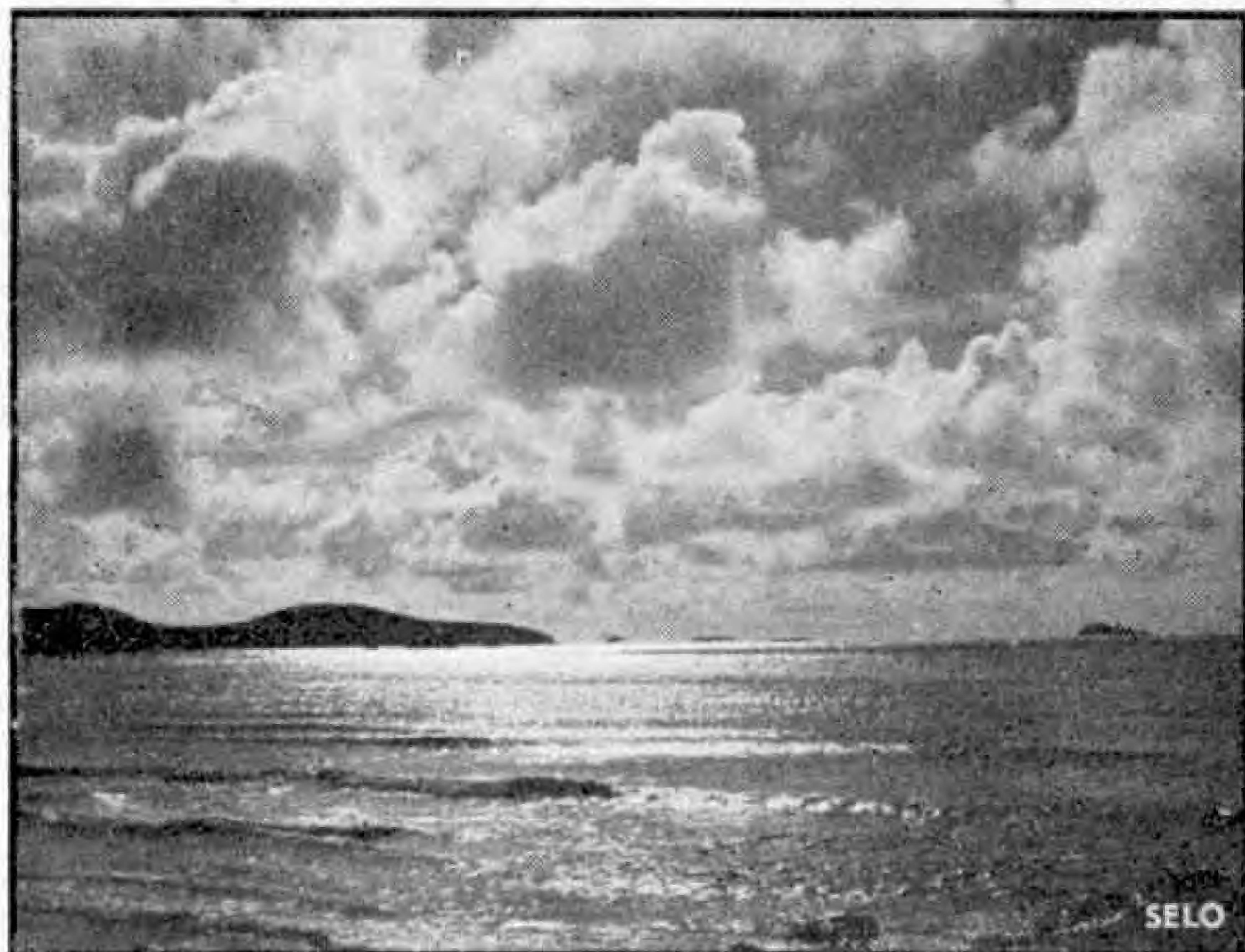
THE film and what you do with it at the moment of exposure are the most important factors in picture-making, the type of camera is less important. You can learn photography quite well with a simple camera, and when you are dissatisfied with a picture remember that you are more likely to have been at fault than your camera. Now for a few hints to help you.

First, the film. For the beginner I recommend most strongly a first quality orthochromatic film like Selochrome. This has the latitude to absorb exposure errors without impairing the quality of the final picture, unless the errors have been really bad. The film is fast and is sensitive to yellowish light so that it can be used effectively late in the day when daylight is waning and yellow.

Second the exposure. What a fuss we make about this, and yet the exposure required for 90 per cent. of subjects in good light when Selochrome film is used is 1/25th second at f/11—a simple camera snapshot. Sometimes when the light is poor a "time" exposure is needed, and then we perhaps forget that only two seconds means 50 times a normal snapshot exposure. For ordinary outdoor photography the day has to be dull indeed for the film to need so long.

Now for some ways in which you can make your pictures better.

The photograph is made by the light reflected from the subject. Generally strong side lighting is most desirable; the shadows of solid objects thrown across the picture give desirable contrast with the highlights and tend to enhance the impression of relief. For these reasons it is undesirable to have the sun immediately behind you when exposing, or to take the subject in dull "all-over" lighting if it can be avoided. It is always worth while to wait for the right lighting when you have a good subject. A few minutes' wait while a cloud passes from the face of the sun will be amply repaid.



"Seaside." A snapshot on Selo Fine Grain Panchromatic Film taken against the light. Sun behind light clouds. Exposure 1/50th second at f/11.



"Fairy Glen." An against-the-light picture taken on Selochrome film. Exposure 1/25th second at f/16. See how the figure looking into the scene concentrates attention on the main subject. Photo. Bilbe.

The camera manual of instructions usually advises the beginner not to photograph into the light, and for the beginner this is sound advice. But when you have progressed a little it is a mistake to observe this rule slavishly. The reason for such advice is that direct rays from the sun, if this is included in the picture area, may be reflected and scattered by the lens, causing light blobs and haziness over the picture.

But delightful pictures can be made against-the-light if due care is taken. The sun must be excluded by sighting the camera beneath or to one side of its disc, as in "Fairy Glen," or by obscuring it with a figure or some part of the subject that will be rendered in silhouette. The sun should only be included when it is veiled by light clouds, as in "Seaside."

Sometimes a picture is greatly improved by a figure in the foreground. The figure must be carefully placed otherwise it may serve only to distract attention from the main subject. See that the figure looks towards the focus point of the picture and not away from it. In other words, the person should look into the "composition" and not out of it. A good illustration of this rule is seen in "Fairy Glen."

Another hint! Why not "frame" your pictures sometimes? I am not referring to actual frames made of wood, glass and so forth, but to a method of taking pictures through some surround, so that the view will be seen with a frame round it. The frame may be formed of overhanging branches, a window-frame, or a doorway.

From Our Readers

This page is reserved for articles from our readers. Contributions not exceeding 500 words in length are invited on any subject of which the writer has special knowledge or experience. These should be written neatly on one side of the paper only, and should be accompanied if possible by original photographs for use as illustrations. Articles published will be paid for. Statements in articles submitted are accepted as being sent in good faith, but the Editor takes no responsibility for their accuracy.

LIVERPOOL AND MANCHESTER RAILWAY OFFICES OF 1830

As most readers of the "M.M." will be aware, the first passenger station in Liverpool of the Liverpool and Manchester Railway, opened in 1830, was Crown Street, Liverpool, from which the "Rocket" started on the inaugural run to Manchester on 15th September 1830. When the tunnels and cuttings from Edge Hill to Lime Street were completed Crown Street became a coal and goods depot, as it still remains. Of the original passenger station several of the booking offices and the waiting room remain, and up to the time of the "blitz" the general offices of the Liverpool and Manchester Railway were still to be seen in Smithdown Lane, Liverpool, just above Crown Street Station. Many years prior to the war they had fallen from grace, becoming a marine stores, but now they are gone, and with them went another link with the early days of the locomotive.

The accompanying photograph of these old offices was taken at the time of the Liverpool and Manchester Railway Centenary Celebrations at Liverpool during September 1930. It was a visit to the Railway Exhibition in St. George's Hall, where I saw an old print of the offices in their heyday, that sent me post haste to secure a lasting record of this historic building.

CYRIL R. ROWSON (Liverpool 11).

DUBLIN'S NEW BASCULE BRIDGE

The photograph on this page is of an unusual type of bascule bridge recently erected near the docks in Dublin. The bridge crosses a short stretch of ship canal that formerly was spanned by an old-fashioned hand-operated swing bridge that took two men about 10 min. to open or close. It is of the "pull up" lift type, and is believed to be the only one of its type in the British Isles.

The bridge is built of steel and is electrically operated. Rocker girders pivoted on steel towers are

used to raise and lower the span in somewhat the same manner as the rocker arms are used to open and close the valves in an overhead valve type internal-combustion engine. There is a counterbalance of concrete and cast iron on the extreme rear of the rocker girders.

The front end of the rocker overhangs the span and is connected to it by means of two long steel



The original offices in Liverpool of the Liverpool and Manchester Railway. Photograph by C. R. Rowson, Liverpool 11.

links. At their very centres, one just inside each tower, the rockers carry toothed quadrants, and it is through these and suitable gearing that they are raised.

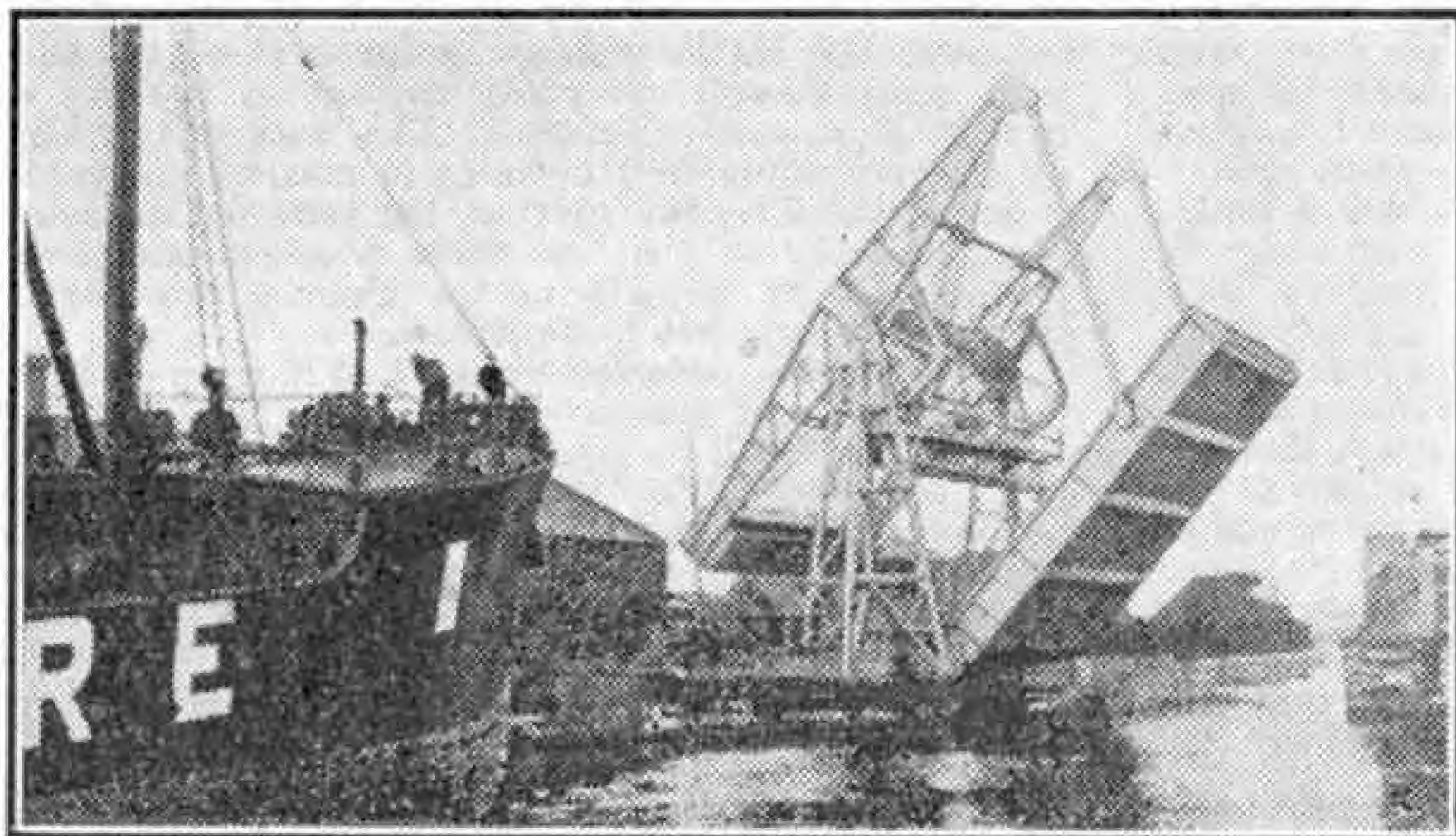
BRIAN R. T. CONNOLLY (Dublin).

A NOVEL TRIP OVER BARCELONA

When I visited Barcelona I was fascinated as I watched the tiny cars of the city's cable railway travelling to and fro between the great towers, and determined I would travel in one of them. When I did so it was dark, which made the journey all the more exciting. My brother and I went to the great central tower, which is 250 ft. high, and climbed about 30 ft. to the booking office. There we obtained our tickets and stepped into a lift that whisked us to the top, passing a restaurant, about three-quarters of the way up, where diners can sit and gaze over Barcelona.

At the top of the tower there is a little platform, behind which is the engine room, with a huge wheel on which are wound the cables attached to the cages. We only had about five minutes to wait before a cage arrived. As we slowly moved off I looked through the little window and my first feeling was of floating in complete emptiness. Then I gazed in wonderment at the myriad of twinkling lights below. The harbour was full of great ships, all brightly lit and with dark shadows between them. It was great fun trying to distinguish the different ships from this new angle. The full trip lasted about seven minutes.

J. B. D. CORRIGAN (Belfast).



This new Dublin bridge is believed to be the only one of its type in the British Isles. Photograph by Brian R. T. Connolly, Cabra, Dublin.

Railway News

Last of the L.M.S. "Baltic" Tanks

With the recent withdrawal of engine No. 11110 from the active list, a small but interesting class of L.M.S. locomotives becomes extinct. No. 11110 was the last surviving "Baltic" type engine remaining in service on any part of the L.M.S. system. It was also the only survivor of 10 4-6-4 passenger tank engines of this type that carried L.M.S. running numbers 11110-11119, built for express and semi-express work on the steeply graded main lines of the L.M.S. Central Division, formerly the Lancashire and Yorkshire Railway.

These engines were of special historical interest as they were the first locomotives to be specifically designed for the L.M.S. itself, as distinct from locomotives ordered by the constituent companies and ultimately taken into L.M.S. stock. They were built by Mr. George Hughes, the first Chief Mechanical Engineer of the L.M.S., and were constructed at Horwich, forming one of the very few classes of "Baltic" tanks built for British railways.

Their L.M.S. motive power classification was 5P. They were handsome and powerful engines. To a very large extent they were tank versions of the successful 4-6-0 express passenger engines of the L.Y.R. "Dreadnought" class, the later improved types of which handled much of the heaviest work on the West Coast Scottish express services between Crewe and Carlisle in early L.M.S. days, prior to the arrival of the "Royal Scots."

The tanks weighed a little under 100 tons in working order. They had four cylinders of diam. 16½ in. and stroke 26 in., and coupled wheels 6 ft. 3 in. in diam. The total heating surface, including superheater, was 2,427 sq. ft., and the boiler pressure 180 lb. per sq. in.

Motive Power Variety on the Docks

The dockside railways of a certain seaport town are traversed daily by a wide variety of locomotives, chiefly though not exclusively of the shunting tank type. Three of the four main line companies were represented on a recent occasion, in addition to various private owners having premises in the dock area.

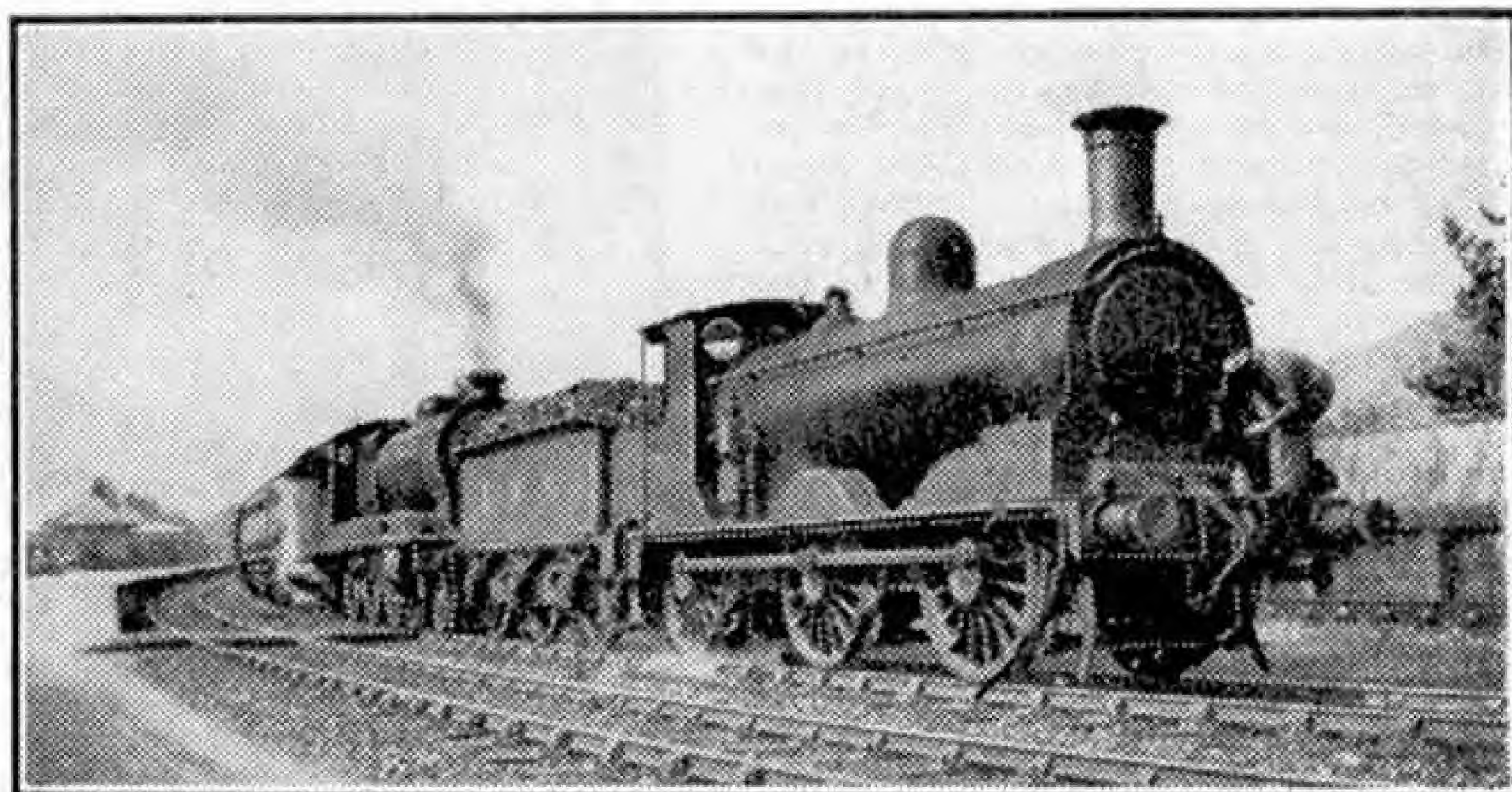
There were several ex-North London 0-6-0 tanks, well off the beaten track for which they were designed. These products of Bow Works still preserve their characteristic outline, although their original chimneys have been replaced by Crewe fittings of L.N.W.R. type. Derby was represented by No. 1780, a typical Midland 0-6-0 tank, still with its Deeley chimney and Salter spring-balance safety valves on top of the dome. An ex-Lancashire and Yorkshire 0-6-0 saddle tank also was observed, its particular style contrasting strangely with the more "square" appearance of one of the smaller G.W.R. 0-6-0 pannier tanks close by. To complete the picture there were two L.N.E.R. 0-6-0 tanks, one of former North Eastern design and the other an ex-Great Central engine.

Privately owned engines seen were all saddle tanks of their various makers' standard patterns, some 0-6-0 with inside cylinders and others 0-4-0 with outside cylinders. Two of the latter looked particularly

villainous. One had had its chimney knocked backward slightly so that it was "raked" like a steamship funnel; while another was hard at work with no chimney cap at all, this embellishment having apparently been lost!

On what might be termed the "main" lines serving the dock estate such big engines as Stanier "5P5F" 4-6-0s were seen, together with G.W.R. 4-6-0s of various mixed traffic classes; and of course there were examples of the numerous "Moguls" or 2-6-0s of both L.M.S. and G.W.R. build. A Horwich 0-6-0 tender engine and a "North Western" 0-8-0 completed the "bag." The numbers of individual engines were not noted.

The shunting horse too is kept busy moving wagons hither and thither, and mighty work is done at times by two of them in tandem. These animals are remarkably intelligent and are quite unperturbed by



An interesting piloted train on the Oban line of the L.M.S. Photograph by O. S. Nock.

ships' sirens, locomotive noises close by, or the constant clanging of buffers and the buzzing of commercial motor vehicles.

L. C. N.

Ultra-Violet Rays Speed up War Freights

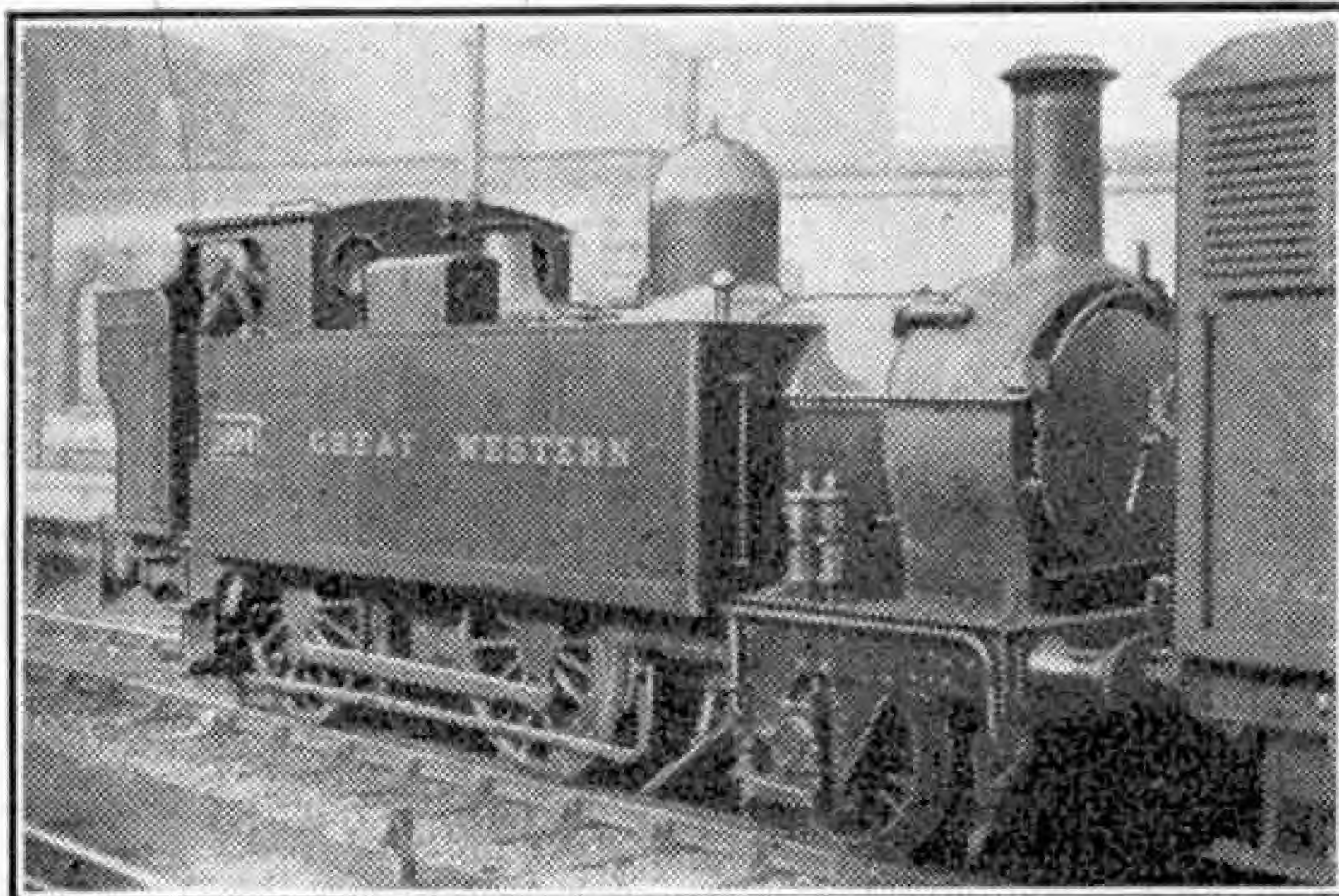
The use of ultra-violet rays and a special type of fluorescent chalk is speeding up the handling of war freights at L.M.S. marshalling yards throughout the country. The blackout slows up the work on the railway, even though a certain amount of lighting is permitted to assist operations. The work of breaking up and reforming freight trains in marshalling yards is one of the activities affected, the principal difficulty being inability to read the chalk numbers placed on the wagons to indicate to the shunter into which siding the wagon has to be placed.

Experiments conducted by the L.M.S. have resulted in this particular difficulty being overcome. Recently an important L.M.S. marshalling yard was equipped with ultra-violet ray lighting. The beam of this is directed down the hump over which the wagons are shunted, and the wagons are marked with a special type of fluorescent chalk. The result is that the numbers glow, so that the shunter is able to read them easily. The system is being extended to other yards.

During 1941 there were 1,462 daily passenger train runs in the United States and Canada in which the average speed was 60 m.p.h. or more. The number of similar runs in 1940 was 1,226.

Fast G.W.R. Tank Engine Running

Along the level 36 miles between Reading and Paddington many speedy runs have been recorded behind tank locomotives working semi-fast trains throughout and also intermediately. In normal times



G.W.R. locomotive No. 1404, a modernised example of the 2-4-0T class. Speed exploits of these engines are described on this page.

many of the non-stop bookings are decidedly fast, and this has been the case for many years.

The remarkable little 2-4-0Ts of the 14xx and 35xx classes, which date back to William Dean's era at Swindon, were remarkably fleet and powerful for their size. Thirty years ago No. 3568, which was cab-less, as all the class had been originally, with nine eight-wheelers on a non-stop from Reading passed Maidenhead at 66 m.p.h., and then averaged over 68 all the way to Acton, with a maximum of 72 at West Drayton. After a severe signal check and a slow finish, the Paddington arrival was still within the 42 min. allowed, and that of course was an express schedule.

On another occasion No. 3565 of the same type, by then boasting the luxury of a cab, was working an up train booked to call at Maidenhead, Taplow and Slough, which travelled on the relief, or slow line. Soon after leaving Reading an express headed by a "Saint" 4-6-0, which had started from there about the same time, came alongside and was rapidly overhauling the semi-fast. The driver of the tank took up the challenge, however, and his diminutive little steed responded with such gusto that she even began overhauling the express: then for some miles afterwards the two trains were running neck and neck at over 60 m.p.h.

From Paddington No. 1418 once hauled no less than 14 of the early clerestory bogies to Slough, 18½ miles, in 23 min. The train could not have weighed much less than 300 tons gross, so that this was a stupendous effort on the part of a 2-4-0T having barely 32 tons adhesion weight.

The present day engines working such services and stopping suburban trains are of the 61xx 2-6-2T type, and are comparatively large and capable of rapid acceleration. They have boilers of 225 lb. per sq. in. pressure, 5 ft. 8 in. driving wheels, 18 in. diam. outside cylinders with the usual long stroke of 30 in., and an adhesion weight of 52½ tons. No. 6164 with six bogies recently ran from

Slough to Paddington in 21 min. at an average of 52.9 m.p.h., in the course of the trip attaining the exceptional maximum of 76 m.p.h. At another time No. 6144 with nearly 300 tons did remarkably well to cover the 24½ miles Paddington-Maidenhead in 27 min. without exceeding 68 m.p.h. These timings in each case were from start to stop and were recorded by Mr. J. N. Maskelyne.

The L.N.E.R. "Garratt" Locomotive's Heavy Work

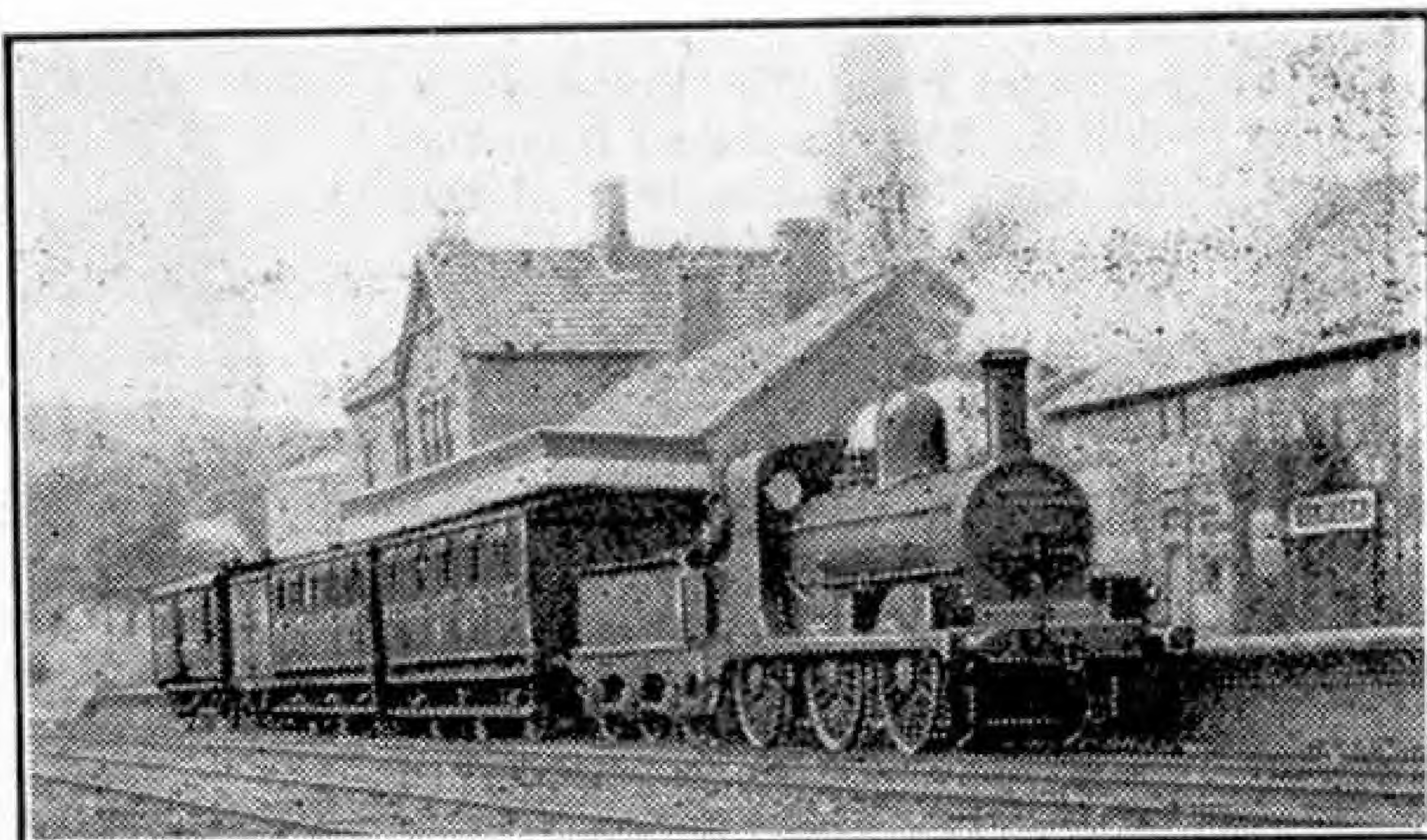
It is estimated that the L.N.E.R. six-cylinder 178-ton Beyer-Garratt 2-8-0 + 0-8-2 engine No. 2395 has helped to move 3½ million tons of coal during the past 12 months. This locomotive was built at Gorton in 1925, and has spent the whole of her working life pushing heavy mineral trains up a three-mile bank at 1 in 40 near Barnsley, Yorkshire. The trains assisted, on their way from the collieries to the main lines, vary in weight from 750 to 1,000 tons, and the journey is now accomplished in 5 min. less time than when the duties were performed by the two eight-coupled freight engines which she replaced as banking locomotives.

No. 2395 is in steam continuously from early on Monday morning to the following Saturday night, with but brief intervals for watering and coaling in between hard spells of pushing.

New "Pacifics" for New South Wales Government Railways

Partly streamlined "Pacific" engines are now being built in Australia for the New South Wales Government Railways. These form the C.38 Class. The new engines have two cylinders, of 21½ in. diam. and 26 in. stroke, and coupled wheels 5 ft. 9 in. diam. The heating surface is 2,614 sq. ft., with superheater surface of 755 sq. ft., and the grate area is 47 sq. ft. The boiler pressure is 245 lb. per sq. in. Thus the tractive effort is 36,273 lb.

The tender has a coal capacity of 14 tons and carries 7,000 gall. of water. The engine weighs 103 tons 14 cwt. and the tender 84 tons, giving a total weight in working order of 187 tons 14 cwt.



A quaint scene in the far west of Eire at Clifden, on the Great Southern Railways. Photograph by H. C. Casserley.

London Electric Trains for Merseyside

Four six-coach multiple unit ex-Metropolitan set trains have been sent on loan by the London Passenger Transport Board to the Liverpool area, where they are reserves for the electrified services operated jointly by the Mersey Railway and the L.M.S.

Suggestions Section

By "Spanner"

(544) A Morse Tapping Key ("Spanner")

Lots of fun and instruction can be obtained from a simple Morse outfit comprising a buzzer and a tapping key, both of which can be built up quite easily from Meccano

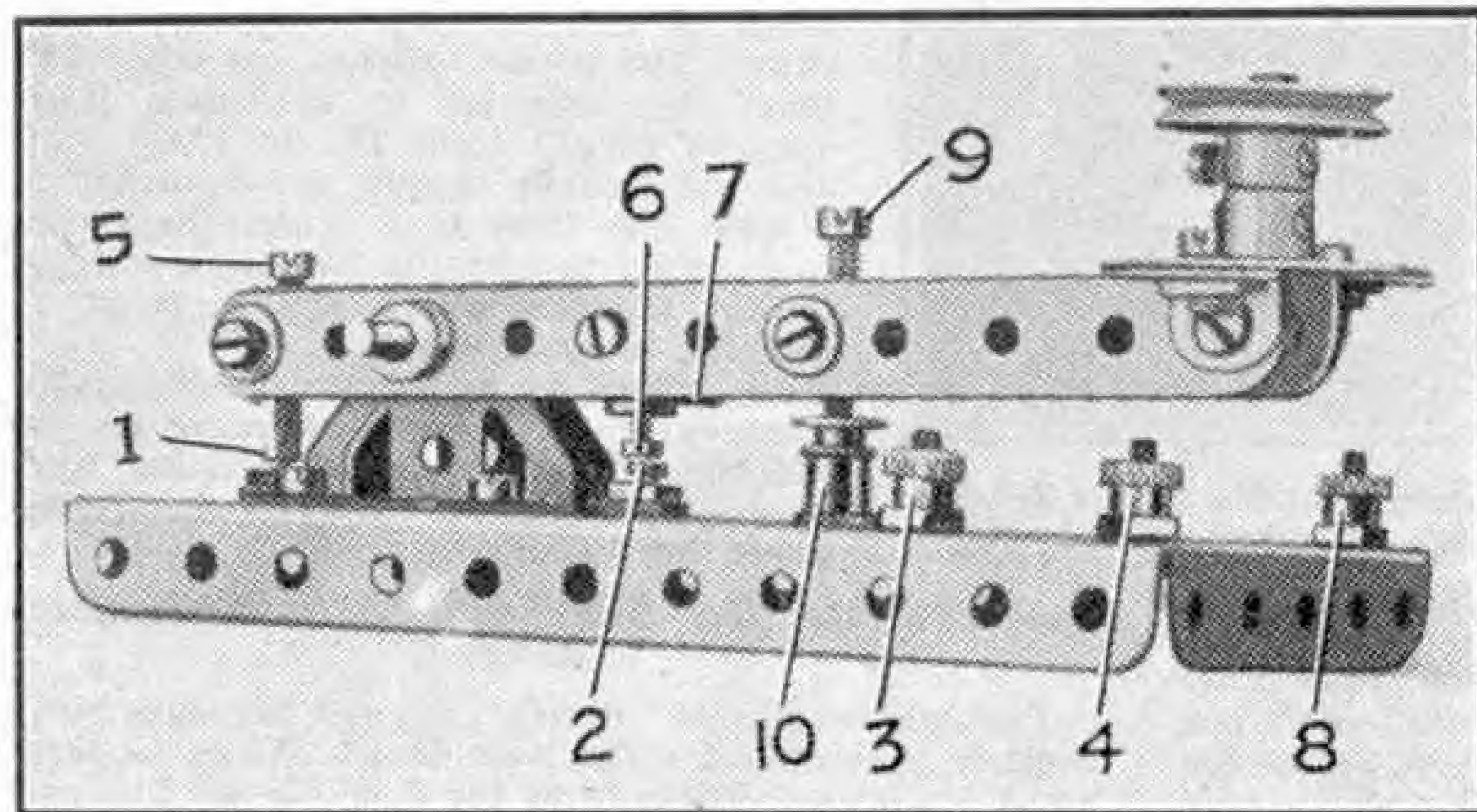


Fig. 544.

parts. A suitable key for the purpose is shown in Fig. 544. To be entirely efficient and smooth in operation the vertical movement of the arm or bar of the key, and the tension of the spring under which it actuates, must be adjustable. Both of these adjustments are provided for in the key illustrated.

The front contact 1 and the back contact 2 consist of 6 B.A. Bolts insulated from the Flanged Plate that forms the base of the model, and secured to it by two Nuts. Contact 1 is connected to an insulated Terminal 3 by a short length of Connection Wire under the Plate, and contact 2 is connected to an insulated Terminal 4.

The corresponding portions of contacts 1 and 2 are mounted on the bar of the key as shown. That corresponding to contact 1 consists of a $\frac{3}{4}$ " Bolt 5 carried in the "spider" of a Swivel Bearing, which is attached to the bar of the key by two Nuts and Bolts. A Washer under the head of each Bolt prevents its shank from binding on the $\frac{3}{4}$ " Bolt 5. By turning the latter the vertical movement of the bar, or gap as it is termed, may be increased or reduced according to whether the Bolt is screwed in or out of the "spider." The portion of contact 2 mounted on the bar is a 6 B.A. Bolt 6 fixed to a Double Bracket 7. Both the

contacts on the bar should be connected to Terminal 8, either through the frame of the model or by means of wire.

The $\frac{3}{4}$ " Bolt 9 is carried in a "spider" in a like manner to the adjustable front contact Bolt 5, and presses on the head of a Spring Buffer 10. By screwing the $\frac{3}{4}$ " Bolt into or out of the "spider" the tension on the bar can be adjusted to suit the person operating it.

(545) Internal Expanding Brake ("Spanner")

The brake mechanism shown in Fig. 545 closely conforms to actual practice, and is remarkably efficient in operation on account of the comparatively large frictional surface of the brake shoes. The shoes consist of $2\frac{1}{2}$ " Strips 1, which are curved to fit inside a Boiler End and bolted at one end to a Meccano Hinge. In their centre holes they carry Threaded Pins that are free to slide in Handrail Supports 2, pivoted to the Face Plate on which the brake is mounted.

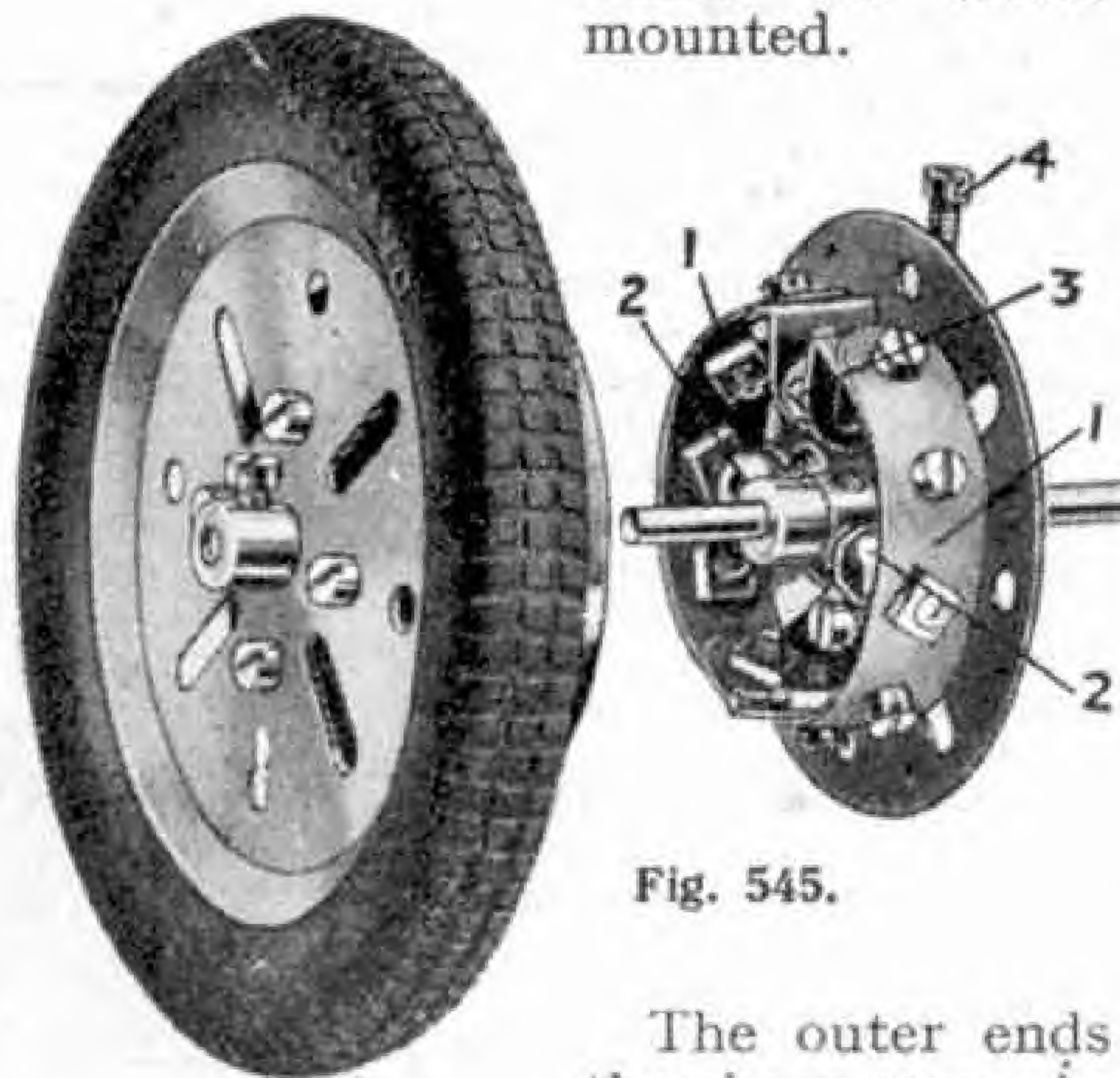


Fig. 545.

The outer ends of the shoes carry Angle Brackets, between which is a Collar 3 with a Threaded Pin in one of its tapped bores. The Pin passes through the Face Plate and is retained in place by a second Collar that carries a $\frac{3}{4}$ " Bolt 4. When the brake is incorporated in a model the Bolt is connected by Cord or wire to the brake operating lever.

The brake shoes fit inside a Boiler End attached to the road wheel. When the Collar 3 is turned, the shoes are expanded and press against the inside surface of the Boiler End, so retarding its rotation. Normally the shoes are held in the "off" position by a length of Spring Cord,

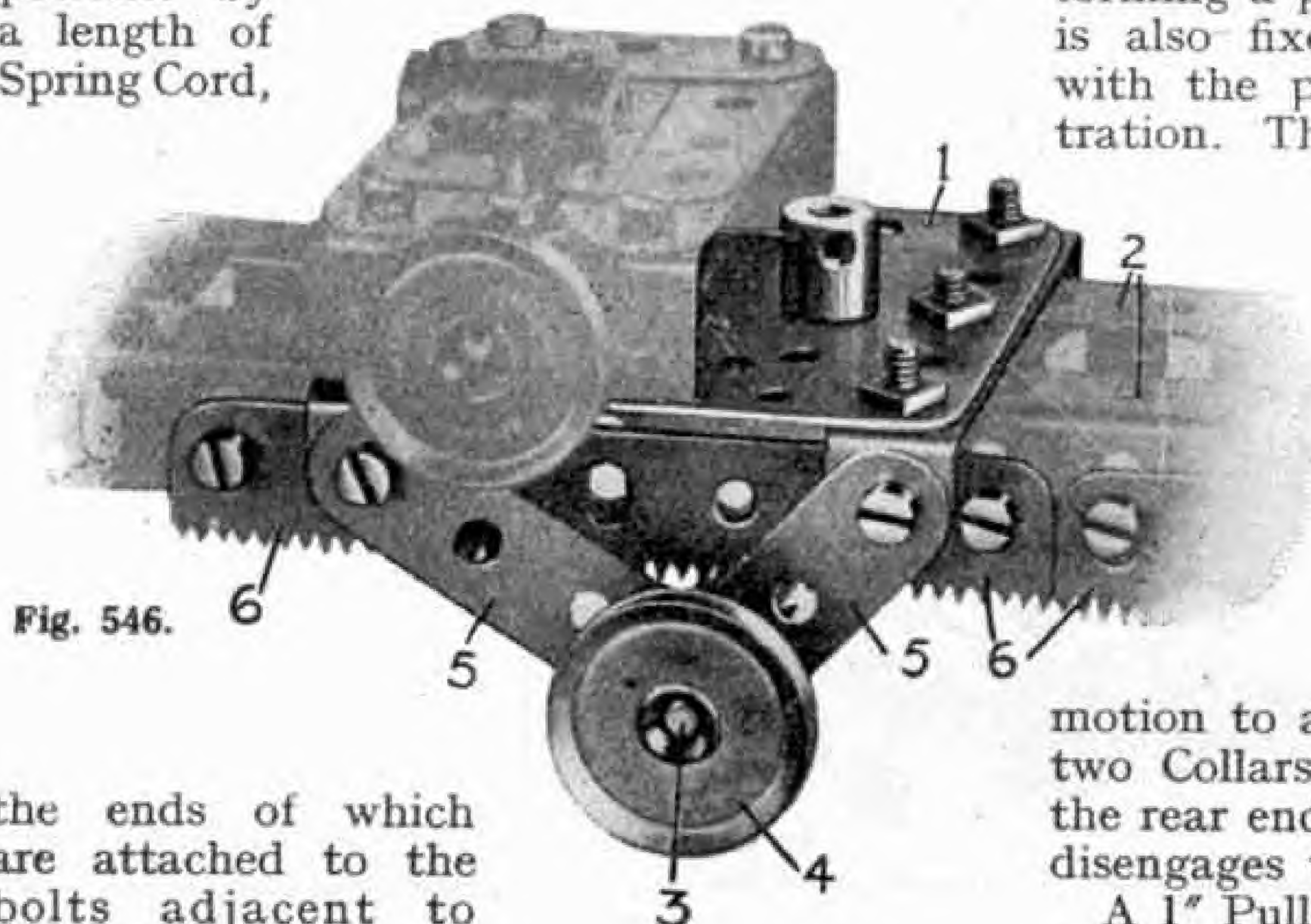


Fig. 546.

the ends of which are attached to the bolts adjacent to those carrying the Hinge. At its centre the Spring Cord is fixed to the Face Plate by a nut and bolt.

(546) Rack and Pinion Traversing Mechanism ("Spanner")

Rack and pinion gear is a very useful mechanism in actual engineering and in Meccano model-building. In actual practice it is employed for a variety of purposes, ranging from the operation of a steep mountain railway to the simple gear sometimes used in opening a row of factory windows. In Fig. 546 is shown a further use for such mechanism; in this case it is adapted to actuate the tool saddle of a model engineer's lathe. The saddle 1 rests on the Girders 2, and is bolted to a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip that slides on a Rod set longitudinally between the Girders. The shaft 3 carries a handwheel 4 and is journaled in Strips 5 bolted to the saddle. It is fitted with a $\frac{1}{2}''$ Pinion, which engages the Rack Strips 6. When the handwheel 4 is rotated the Pinion is forced along the Rack, carrying the saddle with it.

(547) A Simple Time Switch ("Spanner")

Fig. 547 shows a compact and simple mechanism that may be incorporated in model clocks for the purpose of ringing a bell at any desired time, which can be determined simply by setting a pointer to the required hour on a dial.

The drive to the mechanism is taken

from the hour hand shaft of the clock through a 57-teeth Gear that is mounted on the shaft and meshes with a $\frac{1}{2}'' \times \frac{1}{2}''$ Pinion 1. The Pinion meshes with a second 57-teeth Gear 2 mounted freely on a shaft 3 that carries a Threaded Pin forming a pointer. A Handrail Coupling 4 is also fixed on the Rod in alignment with the pointer, as shown in the illustration. The Coupling engages a Collar 5 bolted in one of the outer holes of the Gear 2. A Crank 6 is mounted freely on the shaft 3 and is held by a Compression Spring against the Gear 2, which in turn is pressed against the Handrail Coupling. When the Collar 5 rides over the cam 4 the Crank imparts a longitudinal

motion to a Rod held in its arm between two Collars. Another Collar mounted on the rear end of the latter Rod engages and disengages the arm of the bell striker.

A 1" Pulley 7 fitted with a Rubber Ring is fixed on the shaft 3 against the bearing to prevent the pointer from being driven around with the Gear 2 when the Collar 5 contacts the cam. The Pulley is fitted in such a position on the Rod that the latter may easily be rotated when it is desired to alter the timing of the switch.

When the device is in use the position of the Collar 5 should coincide with that of the hour finger of the clock. If the alarm bell rings either earlier or later than the time that is indicated on the dial by the pointer, the Rod 3 should be adjusted to put matters right.

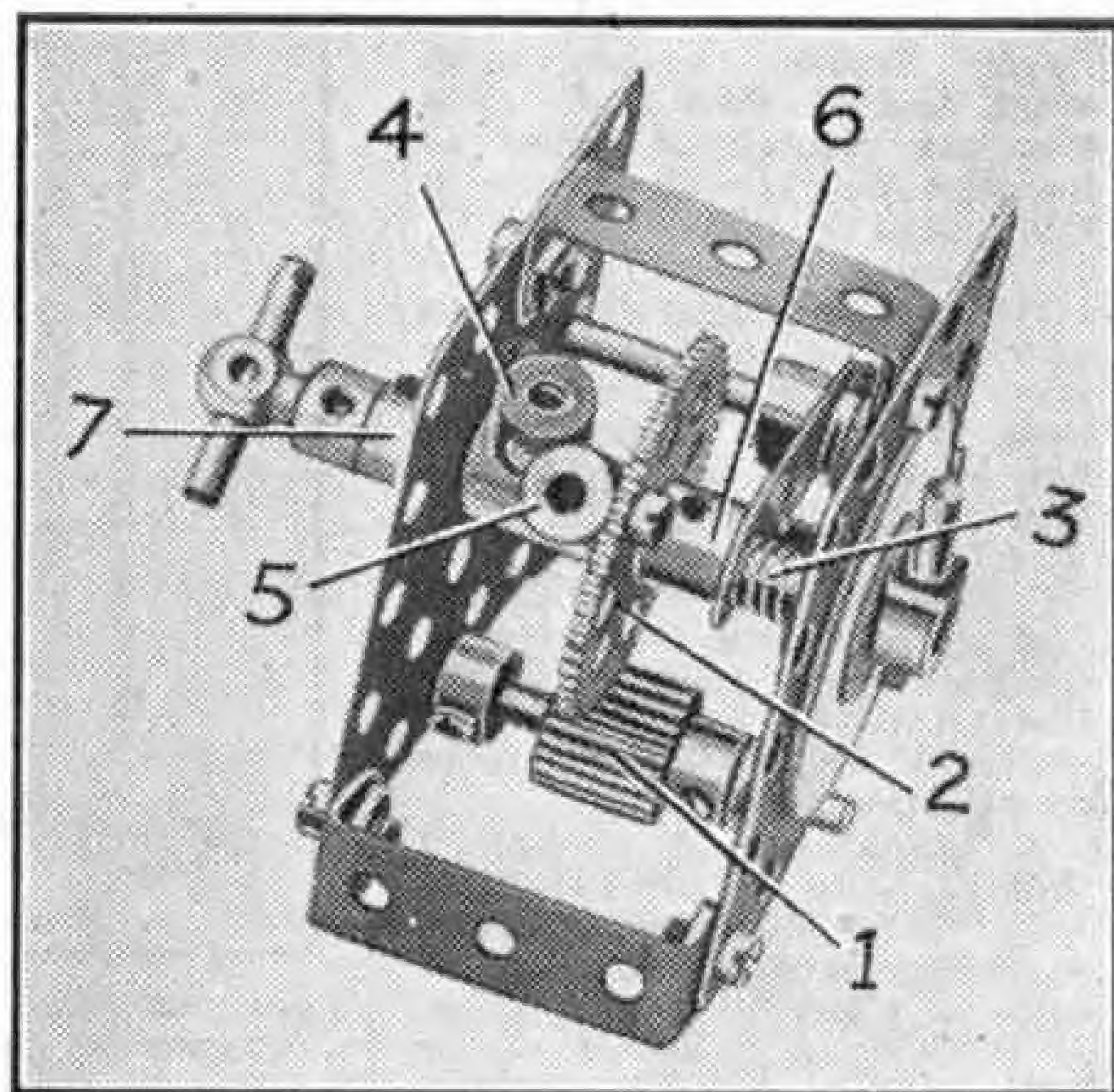


Fig. 547.

New Meccano Models

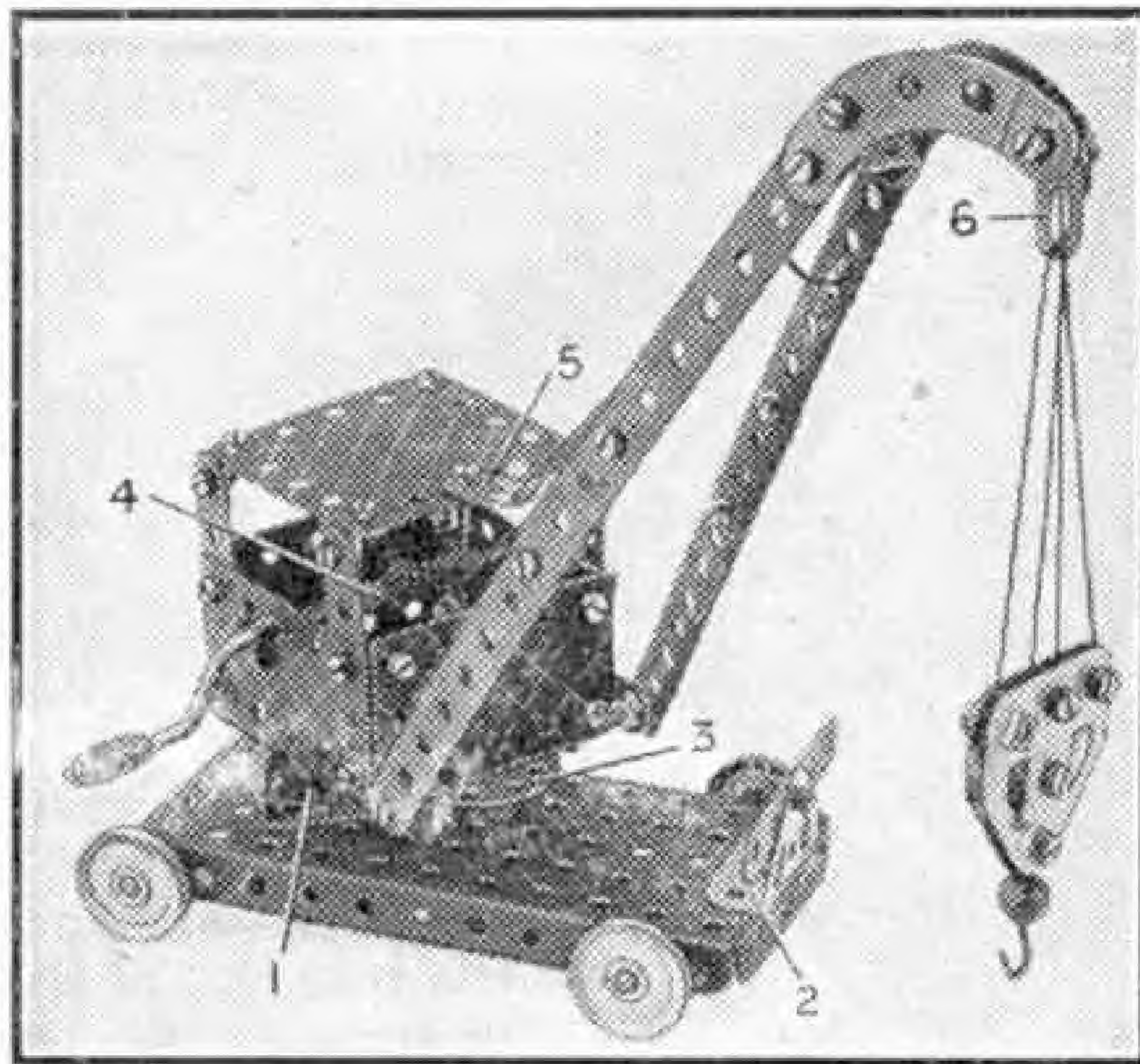
Travelling Crane and Wool Holder

THE first of the two raw models described this month is the simple working crane shown in the upper illustration on this page. This can be built from the contents of Outfit No. 2 and construction should commence with the cab. The floor of the cab is a $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate, to the opposite sides of which are bolted two $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips. To each end of each Double Angle Strip a $2\frac{1}{2}''$ Strip is bolted. The sides of the cab are formed by two $5\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plates bent as shown in our illustration and bolted to the vertical $2\frac{1}{2}''$ Strips. The front and back of the cab are formed by two $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plates, and the roof is a $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate fixed to the $2\frac{1}{2}''$ Strips by Angle Brackets. Two Flat Brackets are bolted to the sides of the cab at the front with $\frac{1}{2}''$ of each Bracket projecting. These form bearings for the pivot bolts of the jib.

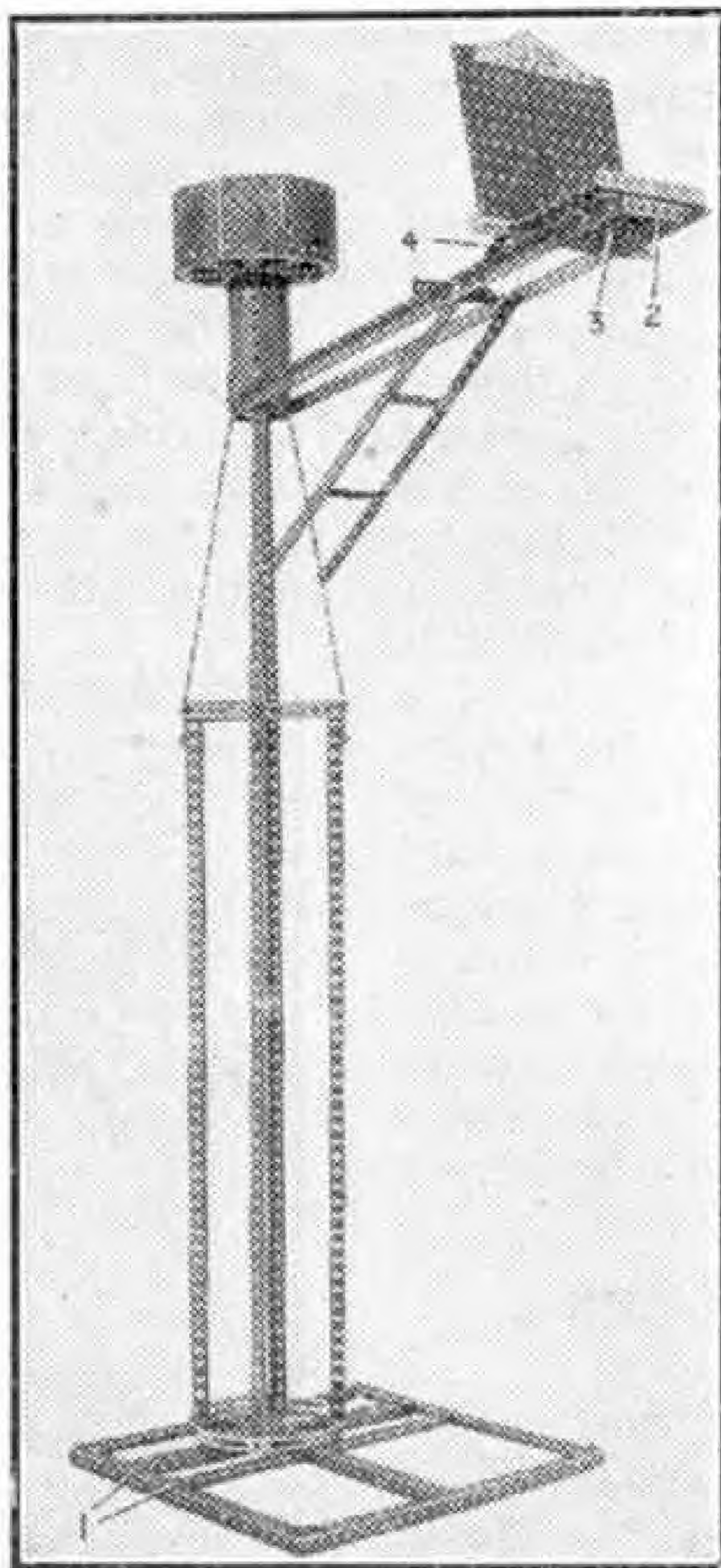
Each side of the jib is built up from two $5\frac{1}{2}''$ Strips overlapped four holes and bolted together, and the compound strip so formed is overlapped two holes on a $2\frac{1}{2}''$ Curved Cranked Strip and bolted to it. The outer ends of the sides are bolted together by means of a $\frac{1}{2}''$ Bolt, and a Flat Bracket and two Washers are placed on the Bolt between them. A Reversed Angle Bracket spaces them apart, and at their inner ends they are pivotally attached to the Flat Brackets by means of lock-nutted $\frac{3}{8}''$ Bolts.

The travelling base consists of a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate, to which is bolted a Trunnion 1 to take the weight of the cab. A Bush Wheel 3 is bolted to the base of the cab, and a 2" Axle Rod is fitted in its boss. A Road Wheel is fixed on the Rod under the Flanged Plate, and a Spring Clip placed on the Rod between the Bush Wheel and the Flanged Plate acts as a spacer. For wheels, 1" Pulleys are mounted on $3\frac{1}{2}''$ Axle Rods.

A Crank Handle is pushed through holes in the cab sides and a Cord Anchoring Spring 4 is pushed on to it. The Rod is held in place by Spring Clips. A Trunnion 2 is bolted to the front edge of the base, and a $2\frac{1}{2}''$ Strip is bolted to it to form



The construction of this interesting but simple travelling crane is described on this page.



An ingenious wool holder that incorporates a stand to support knitting instructions at a convenient height.

a support for the jib when it is lowered.

The jib is held at the required angle by Cord tied to a Flat Bracket 5 and then passed through the hole in the Reversed Angle Bracket of the jib. The hoisting block consists of two Flat Trunnions bolted together and spaced apart by a Washer on each Bolt. A small Loaded Hook is bolted between the pointed ends of the Flat Trunnions.

Parts required to build model travelling crane: 4 of No. 2; 5 of No. 5; 4 of No. 10; 8 of No. 12; 2 of No. 16; 1 of No. 17; 1 of No. 19g; 4 of No. 22; 1 of No. 24; 3 of No. 35; 41 of No. 37a; 35 of No. 37b; 4 of No. 38; 1 of No. 40; 2 of No. 48a; 1 of No. 52; 1 of No. 57c; 2 of No. 90a; 4 of No. 111c;

1 of No. 125; 2 of No. 126; 2 of No. 126a; 1 of No. 176; 1 of No. 187; 2 of No. 188; 2 of No. 189; 2 of No. 190.

Wool Holder

The base consists of four $12\frac{1}{2}''$ Angle Girders bolted together to form a square, and the joints are strengthened by $1\frac{1}{2}''$ Corner Brackets. Two more $12\frac{1}{2}''$ Angle Girders 1 are joined to an opposite pair of Angle Girders, and these are attached to a Hub Disc and a $7\frac{1}{2}''$ Angle Girder.

Four $24\frac{1}{2}''$ Angle Girders are next bolted to the flange of the Hub Disc, and joined to a Circular Girder and four $12\frac{1}{2}''$ Strips. The Strips are bent and are bolted to one end of a Boiler, the other end of which is fitted with a Boiler End. A Hub Disc is bolted to the Boiler End and also to three $5\frac{1}{2}'' \times 2\frac{1}{2}''$ and a $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate.

The book support consists of two $18\frac{1}{2}''$ Angle Girders bolted to a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Double Angle Strip 2 and a $4\frac{1}{2}''$ Angle Girder. A $5\frac{1}{2}'' \times 3\frac{1}{2}''$ Flat Plate 3 is fixed to the latter and a $7\frac{1}{2}''$ Angle Girder to which two $5\frac{1}{2}'' \times 3\frac{1}{2}''$ Flat Plates are secured by a $4\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip 4.

Parts required to build model wool holder; 6 of No. 1; 4 of No. 7; 2 of No. 7a; 6 of No. 8; 2 of No. 8b; 1 of No. 9a; 1 of No. 9b; 2 of No. 12c; 86 of No. 37a; 86 of No. 37b; 33 of No. 38; 1 of No. 47; 2 of No. 48a; 1 of No. 48c; 3 of No. 52a; 1 of No. 113; 2 of No. 118; 4 of No. 133; 2 of No. 143; 1 of No. 162a; 1 of No. 162b; 1 of No. 190; 3 of No. 192.

Meccano Model-Building Competition

By "Spanner"

Aircraft of various kinds are always popular subjects for Meccano models, for they include a great variety of attractive designs that can be reproduced with remarkable accuracy and realism with small Outfits as well as with large ones. Last month we announced a special competition for models of this kind, and as entries in this may be sent in up to 31st May, we are repeating the details.

In this contest prizes will be awarded for the best Meccano models of any type of aircraft. This term covers aeroplanes, seaplanes, flying boats and helicopters, as well as airships and gliders. Competitors may build their models from any Meccano Outfit or any number of parts, and those who possess Aeroplane Constructor Outfits may include a few of the parts from them, provided that they build the main portions of the models from ordinary Meccano parts.

Entries will be divided into two sections: A, for competitors over 14 years of age, and B, for competitors under 14. The age of each competitor will be taken into consideration in assessing the merits of his work.

The following prizes will be awarded in each section: First, Cheque for £2/2/-; Second, Cheque for £1/1/-; Third, Cheque for 10/6. There will be also five consolation prizes of 5/- each.

Competitors should send in either photographs or good drawings of their models, together with brief descriptions of any interesting features that may be present. Envelopes should be addressed "Aircraft Competition, Meccano Ltd., Binns Road, Liverpool 13."

Christmas Model-Building Competition Results

Hundreds of keen Meccano model-builders who sent entries for the "Christmas" Competition announced in the December 1941 issue of the "M.M.," have been eagerly awaiting the judges' decision on their efforts. This month I am able to publish the names of those who were successful in obtaining awards. The full list is as follows:

1st Prize, Cheque for £2/2/-: S. Reid, Aberdeen;

2nd, Cheque for £1/1/-:

S. Aston, Fairford; 3rd,

Postal Order for 10/6:

M. Allen, Morecambe.

Postal Orders for 5/-:

C. Jordan, High

Wycombe; F. Wilks,

Luton; J. Rich, Upton;

A. Grant, Aberdeen; J.

Kennett, Gerrards Cross.

Stewart Reid, Aber-

deen, winner of the First

Prize, submitted three

models representing early

and modern types of

electric tramcars. Each

of these is neatly and

sturdily constructed and

incorporates all the main

features of its prototype.

For example, the model

of a modern tramcar is

fitted with sliding doors

at the centre of the

body and a realistic

streamlined effect is ob-

tained by a cleverly

arranged combination of

Strips and Curved Strips.

The bodywork is

mounted on a chassis

fitted with two four-

wheeled bogies, the axles

of which are suspended

from leaf springs. All the

models are equipped

with seats and power

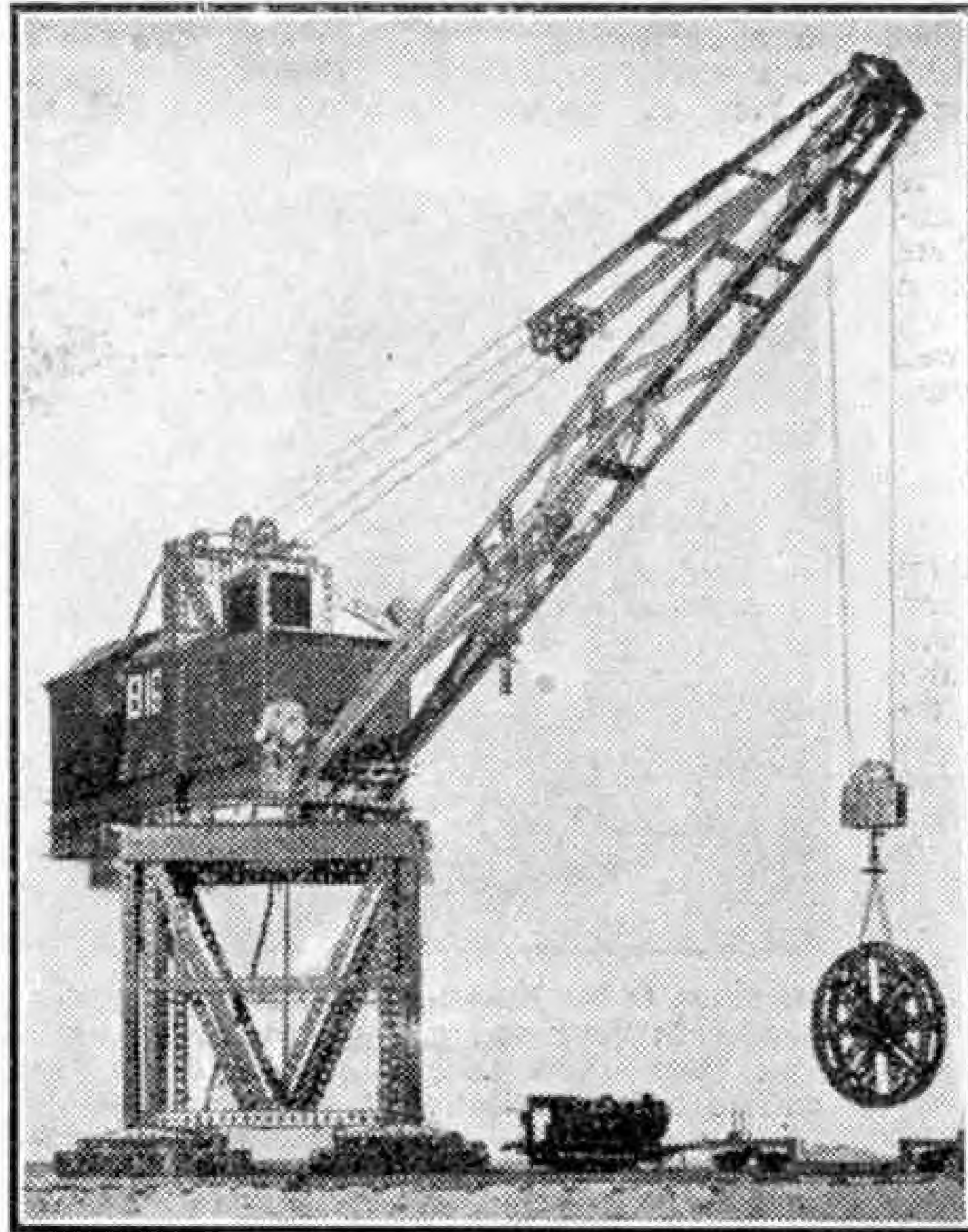
controls, and include

details such as handrails

and safety grids.

Second Prize was awarded for a fine model motor coach built by S. Aston, Fairford. Although the chassis of the coach is not fully equipped mechanically, owing to lack of a driving Motor, the judges decided that the excellent work done by this competitor in building the bodywork fully merited a high award. The external appearance of the model is most pleasing, and among the many small details that Aston has contrived to include are an emergency petrol tank, driving mirror and headlamps formed from Chimney Adaptors. A hand-me curved roof, with a sliding portion, is built from Strips bolted to 2½" Cranked Curved Strips and 5" Curved Strips. A sliding door for passengers is situated at the rear of the model, and a second door is hinged to the driver's compartment.

M. Allen was awarded Third Prize for the fine model of a heavy travelling crane illustrated on this page. The model is electrically-operated from a 20-volt Electric Motor fed from a Transformer, both of which are housed in the driver's cab. The operations of travelling, luffing, slewing and hoisting are controlled from levers, and can be operated separately, simultaneously or reversed.



A fine model travelling crane that won Third Prize for M. Allen, Morecambe, in the "Christmas" Competition.



Club and Branch News



WITH THE SECRETARY

THE SUMMER PROGRAMME

The outdoor season is again almost with us, and I hope that preparations have been made in every Club for suitable excursions and open air meetings. This year it will be necessary to restrict visits to places nearer home than usual, but these can be just as enjoyable and profitable as those of the past.

An idea that might be adopted with advantage is suggested by the visit, referred to in "Branch News," of members of the Islington M.C. and Branch to the Clapham Common Branch. This was a particularly attractive event. The hosts laid down a special large track for the occasion, and members of both organisations shared in operations on it, while the proceedings were completed by an exciting train-stopping contest. Wherever there is a Club or Branch within comparatively easy reach an interchange of visits could well be arranged, as part of the summer programmes of both.

THE "M.M." IN CLUB LIBRARIES

Club and Branch members have written to tell me how disappointed they have been because they have been unable to secure their copies of the "M.M." This of course is due entirely to the shortage of paper, and I am afraid that in present circumstances there is no help for it, as more copies cannot be printed. The difficulty can be overcome in Club life by arranging a scheme for passing copies of the Magazine round. Most Clubs and Branches already include the "M.M." in their library. Others should now follow their example, and members too should share their copies with each other, in order to make sure that every member sees every issue.

If these arrangements are made the Magazine will continue to provide information and to inspire new models and more enjoyable Hornby and Hornby Dublo train operations. The reduction in size has not affected its value in this respect, for all the old features have been retained, and it is good to find that the handy pocket form it now takes has won general approval.

Club Notes

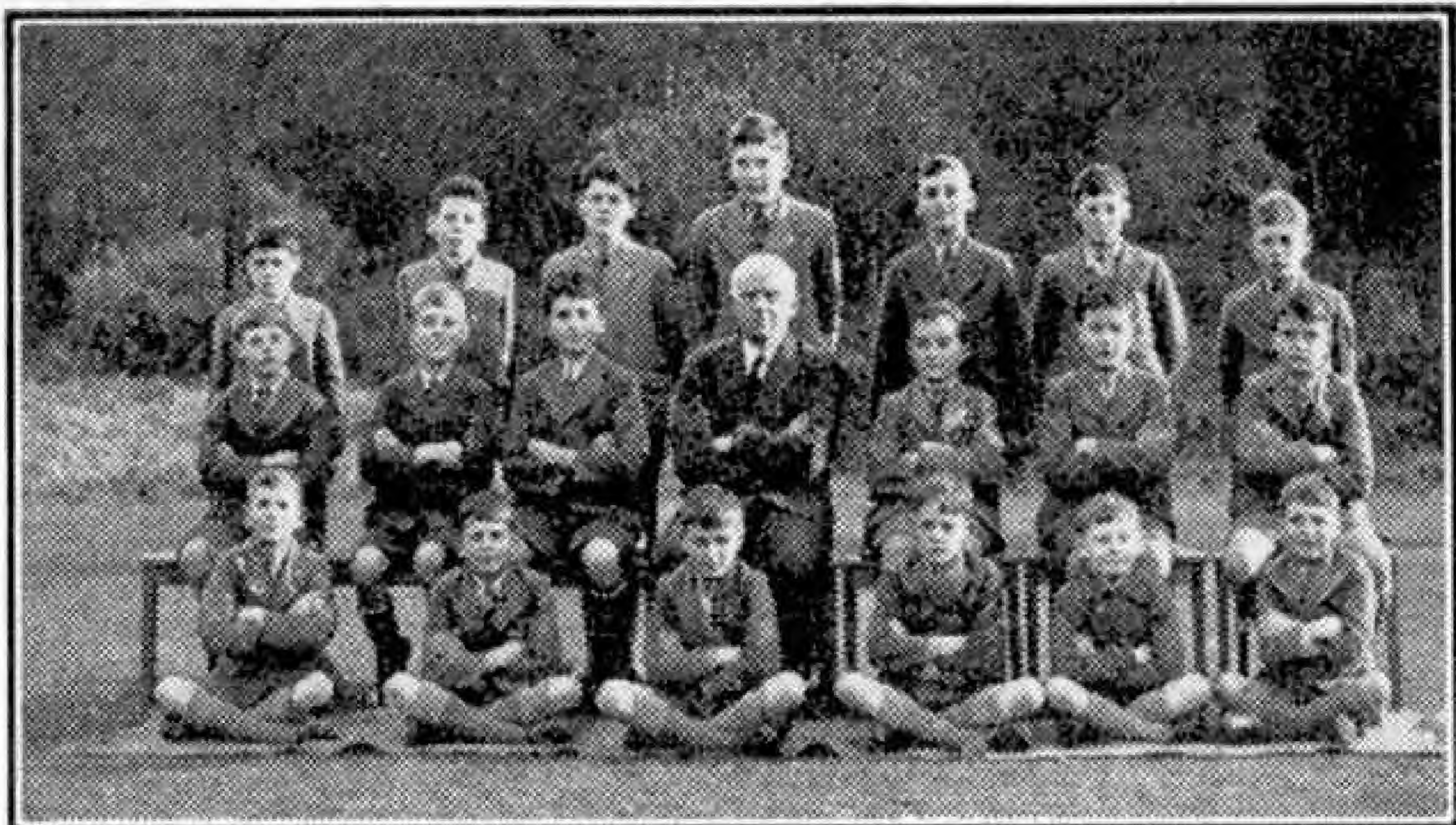
Totnes M.C.—New members have been secured and good progress has been made. The "Nuts" and "Bolts" have appointed Games Captains. The "Bolts" held an exciting General Knowledge Contest, and a Table Tennis Tournament has been held. Model-building Contests continue to be enjoyed, and one that was particularly good was a blind-fold competition. Club roll: 15. *Secretary:* P. Pascall, The Gables, Totnes.

Hillside (Whitefield) M.C.—Model-building Contests have been the chief occupation of members, one particularly interesting entry being a fine model of an ocean liner. General Knowledge Contests have been arranged, and an agreeable variation was provided

by a Social Evening. The Club has an aircraft recognition section, and its members are becoming proficient, as the results of recent contests show. Club roll: 15. *Secretary:* D. I. Johnson, 27, Hillside Avenue, Whitefield, Nr. Manchester.

AUSTRALIA

Maylands (Perth) M.C.—The Factions continue their rivalry in Model-building and Games, while Reserve meetings also have been held regularly. Semaphore signalling has been taken up by all members, who practise regularly. Many models were built for the last Club Exhibition, and Morse code and buzzer practice also has been enjoyed by members. A cycle run allowed members to enjoy practice in open air signalling. Club roll: 33. *Secretary:* J. Franklyn, 24,



Members of the Pennthorpe School (Billingshurst) M.C., with Mr. S. G. Braby, Leader, in the centre of the second row, and D. Cave, Secretary, on his right. This busy school Club was affiliated in February 1936. Model-building is carried on enthusiastically, members designing and constructing many fine original productions.

Kennedy Street, Maylands.

NEW ZEALAND

Spring Creek (Marlborough) M.C.—Entries in a keenly contested Model-building Competition included a battleship, a travelling crane and a Bren gun carrier, which secured the first three prizes in order. Games Nights also have been held regularly. A Committee has been appointed to arrange an outdoor programme. Club roll: 10. *Secretary:* D. G. Corbett, Spring Creek, Marlborough, New Zealand.

Branch News

Clapham Common.—Track running has continued with real efficiency. At one meeting the L.N.E.R. passenger service between Liverpool Street, Fenchurch Street and Victoria Park was reproduced. At a special meeting an epidiascope Lecture on "Queen Mary" was given by Mr. S. Salmon, Chairman, and Mr. K. Maycock, Vice-Chairman. On another occasion a special room was hired to allow a large track to be laid down when members of the Islington M.C. were visitors. A train stopping competition between the two organisations was greatly enjoyed. Mr. L. E. Mason, secretary, gave an interesting Lecture on "The Locomotives of the S.R." *Secretary:* L. E. Mason, 215, Magdalen Road, Earlsfield, London S.W.18.



Concrete Railway Sleepers

IN normal times practically all the four million or so sleepers used every year on the railways of Great Britain are imported, chiefly from countries bordering on the Baltic Sea and to a lesser extent from Canada. Under present wartime conditions shipping facilities for this type of cargo are very limited, and recourse has to be had to the use of home-grown timber supplies, which do not generally yield the type of sleeper which gives the longest life in this country.

In order, therefore, to supplement supplies of timber sleepers and conserve those of better quality for use in main lines, reinforced concrete sleepers have been designed, as an alternative, for sidings, goods loops and branch lines where no high speeds are attained.

Many types of concrete sleepers have been manufactured in the past, but experience has shown them to be unsuitable for use in fast-running main lines.

It is, of course, quite possible to design a ferro-concrete sleeper similar in general shape and size to the ordinary wooden sleeper, but the weight of such sleepers is from three to four times as great as that of timber sleepers and this makes their handling and laying in more difficult.

An alternative type of concrete sleeper consists of two separate reinforced blocks, or "pots" placed one under each rail of the track; at intervals pairs of these are connected together by steel tie bars.

Sleepers of this pattern have been manufactured in considerable quantities at the Great Western Railway Company's concrete depot at Taunton since the early part of 1940 and the results are promising.

Possibly many readers of this article have already seen this type of sleeper in the track, especially where new nests of sidings have been laid down, but the following particulars will be of interest.

Each "pot" contains about 22 ft. of round steel bar in the form of a shallow rectangular cage; 12 "pots" weigh a ton.

Each cast-iron rail chair is secured to the concrete sleeper by means of two bolts with large square washers on the underside.

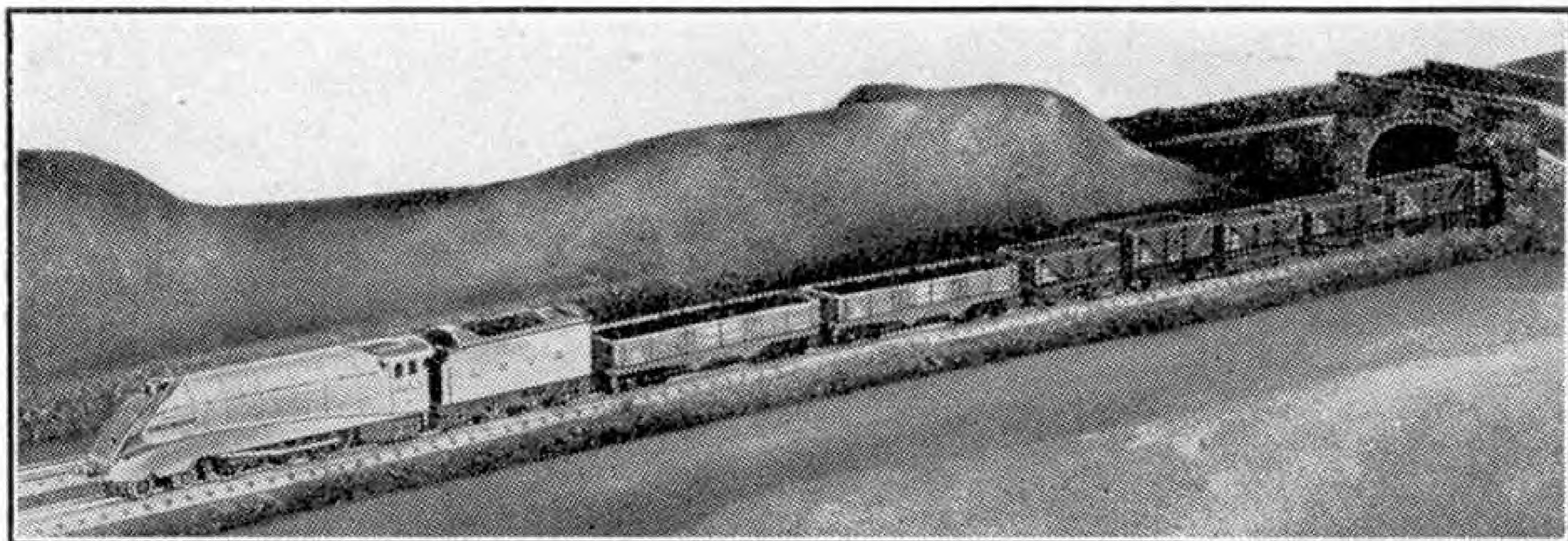
An elm bearing pad $\frac{3}{4}$ in. thick is inserted between the chair and "pot."

As a general rule alternate pairs of "pots" are connected across the "four-foot" by means of a steel bar of angle section which is secured at each end by the inner chair bolts.

The chair, key and rail used with this type of sleeper are the same as those in general use with wooden sleepers.

The photograph shows track laid with concrete "pot" sleepers some 19 months ago, since when it has been carrying satisfactorily some of the longest goods trains hauled by the company's heaviest engines.

This article is reprinted from the "Great Western Railway Magazine" by courtesy of the Editor.



A "mineral special" on a Hornby-Dublo railway headed by a 4-6-2 streamliner. The running of the bogie wagons next to the engine is explained in this article.

Using Hornby-Dublo Rolling Stock

IT sometimes happens that the effect of quite a good selection of rolling stock is spoiled because the various items are used in an unrealistic manner. In this article we deal with points that can be followed up by Hornby-Dublo railway owners, confining ourselves mainly to goods rolling stock.

In a mixed goods train, perhaps of the "pick-up" kind that works its way along the line taking up wagons here and putting them off there, it is possible that there will be quite a mixture of rolling stock of different kinds. As a rule, however, wagons conveying similar kinds of traffic will either have come from or be bound for the same point so that vans for perishable traffic, for instance, would most likely be assembled together. This is the idea shown in the lower illustration. Here a standard 0-6-2 Tank Locomotive is dealing with a mixed train of wagons and vans, the open wagons being assembled at the head of the train and the vans at the rear. Two of the vans are of special character, a Fish Van N.E. and a Meat Van S.R.; and the other vans are suitable for use on a perishable traffic train.

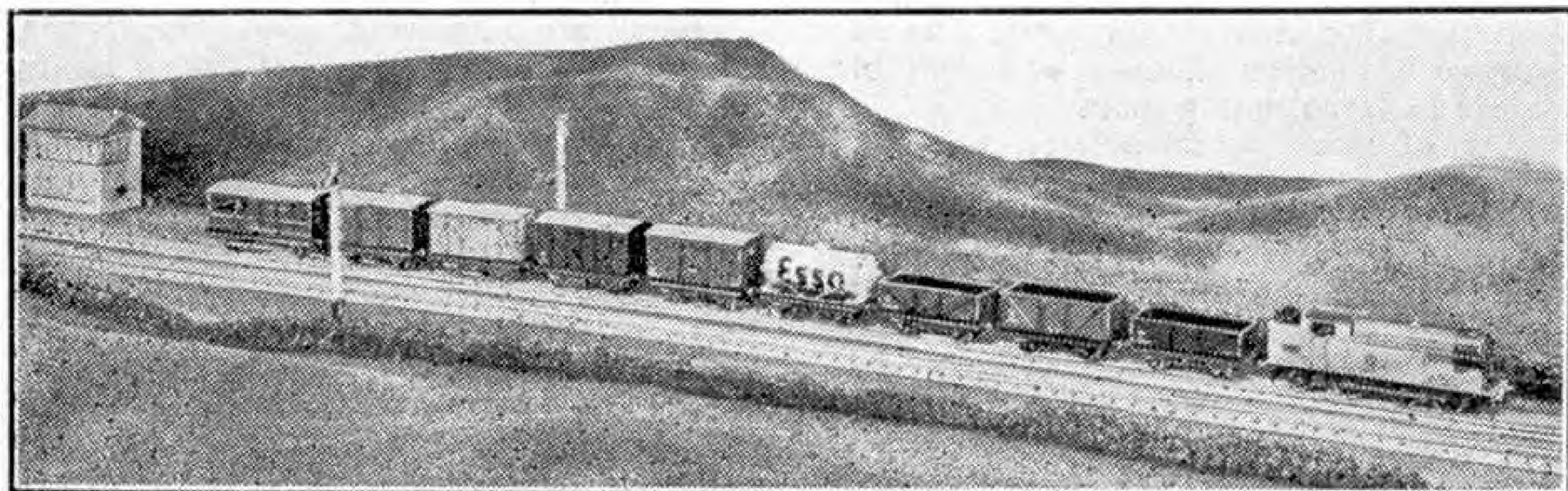
The position of a loaded petrol tank wagon is subject to certain regulations. It should be near the centre of the train, to be as safe as possible from the effects of head-on or tail-end collision, and well away from danger from fire or sparks from the engine. This accounts for the position of the "Esso" Petrol Tank Wagon in the illustration.

Express freight trains, conveying perishables, are made up as a rule only of vehicles fitted with automatic brakes just as is a passenger train. Actually

all the vans in the Hornby-Dublo range can be considered as brake-fitted, so that there is a fair selection to choose from when assembling a perishable or livestock express freighter.

In the ordinary way open goods and mixed wagons will not be included in the composition of a fully fitted express goods train, but they can form part of a fast train composed of a proportion of brake-fitted stock. In that case the supposedly brake-fitted vehicles should be assembled together next to the engine. This is done in real practice so that there will be as much braking power available as possible. Thus if the mixed freight train referred to previously had been a "fast goods" instead of a local pick-up, the vans at the tail of the train, representing brake-fitted prototypes, would have been arranged next to the engine.

An exceptional open wagon is the Hornby-Dublo High Capacity Wagon, which represents the bogie vehicle largely used on the L.N.E.R. for brick traffic. It can be used for other purposes as well, and in the upper illustration two of them are shown forming part of a mineral train composed otherwise of Dublo Coal and Open Wagons. This is a "special" arranged at short notice to run on a fast schedule, so that the use of the popular streamliner No. 4498 "Sir Nigel Gresley" is quite reasonable. In addition, as the High Capacity Wagon represents a fitted vehicle, it is quite correct to arrange two of them behind the tender of the engine. The miniature train thus represents very effectively a "partially-fitted" train of actual practice.



A mixed "pick-up" goods train, including a "loaded" Petrol Tank Wagon. Such wagons have to be as far as possible from either end of the train.

Sidings and Loop Lines in Hornby-Dublo

THE first addition to the plain oval or circular track with which most Hornby-Dublo railway owners begin operations usually takes the form of a set of Points. These are a necessary item of track equipment, for they form the only means of transferring trains from one line to another. With Points, sidings, loop lines and other track arrangements are made possible and in this article we show how various schemes can be developed.

As a rule the first purpose of a set of Points is to form a siding branching off the main line as shown at A in the diagram on this page. The length of the straight portion of Hornby-Dublo Points is exactly equal to that of a standard Dublo Straight Half Rail; therefore when inserting Points in an existing layout a full length Straight Rail is generally removed and the Points and a Straight Half Rail are substituted. The curved arm of the Points exactly corresponds to a standard Curved Half Rail. Therefore to bring our siding parallel with the main line we add a Curved Half Rail to the curved arm of the Points in such a manner as to form a reverse curve; then we add as many Straight Rails to this as we require according to the length of the siding. To finish off the siding we add Buffer Stops at the end remote from the Points.

We now have a siding that we can use for the storage of rolling stock either passenger or goods; in addition we can use it as a "refuge" for slow goods or empty trains when an express possibly is required to be run on the main track. On electrically-operated railways the necessary isolating arrangements will be made, as previously described in these articles on several occasions, in order that the engine working the refuted train can be "cut out" electrically and thus not interfere with the running of another engine on the main line.

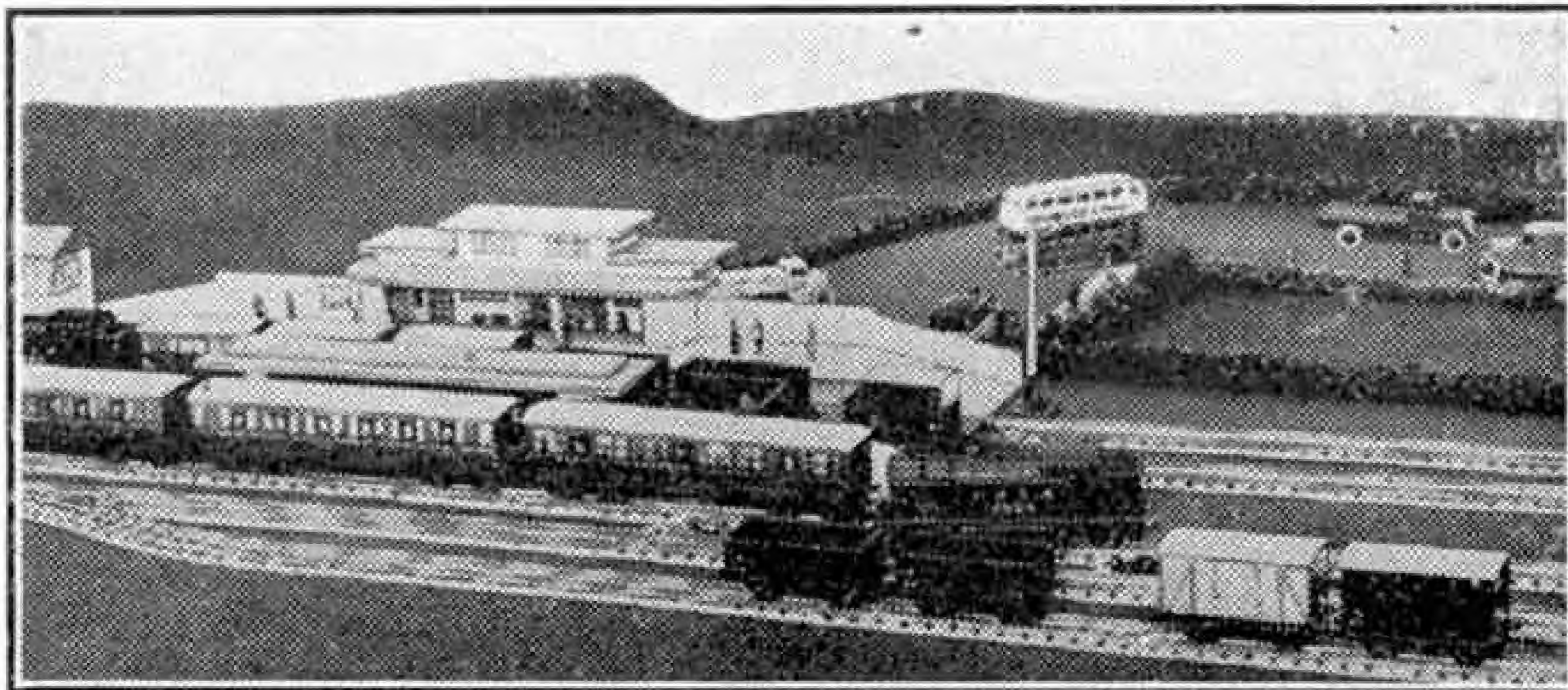
One drawback of the dead-end type of siding we have just described lies in the fact that a backing movement is necessary, either for a train to enter the siding or to leave it, according to whether the Points are trailing or facing to the direction in which the trains usually run on the main line. If we have space enough, however, and another set of Points of the opposite "hand"

to those we have first used, we can convert the dead-end siding into a loop line as shown at "B" in the diagram. We remove the Buffer Stops and make exactly the same alterations to the track as we did before in order to insert the new set of Points in the main line and to join up to the existing part of the siding. The relation between the Points and the Straight and Curved Rails of the Hornby-Dublo System is such that the siding, or rather loop line, between the Curved Half Rails at each end will consist of one less than the number of full length Straight Rails lying between the two Points on the main line.

On electric railways a loop line requires two

insulating gaps, one near each end of the loop; but only one of the gaps needs to be connected up to an Isolating Switch. The two gaps are necessary to allow the loop to be isolated completely from the main line.

As the diagram shows, the loop line can be entered



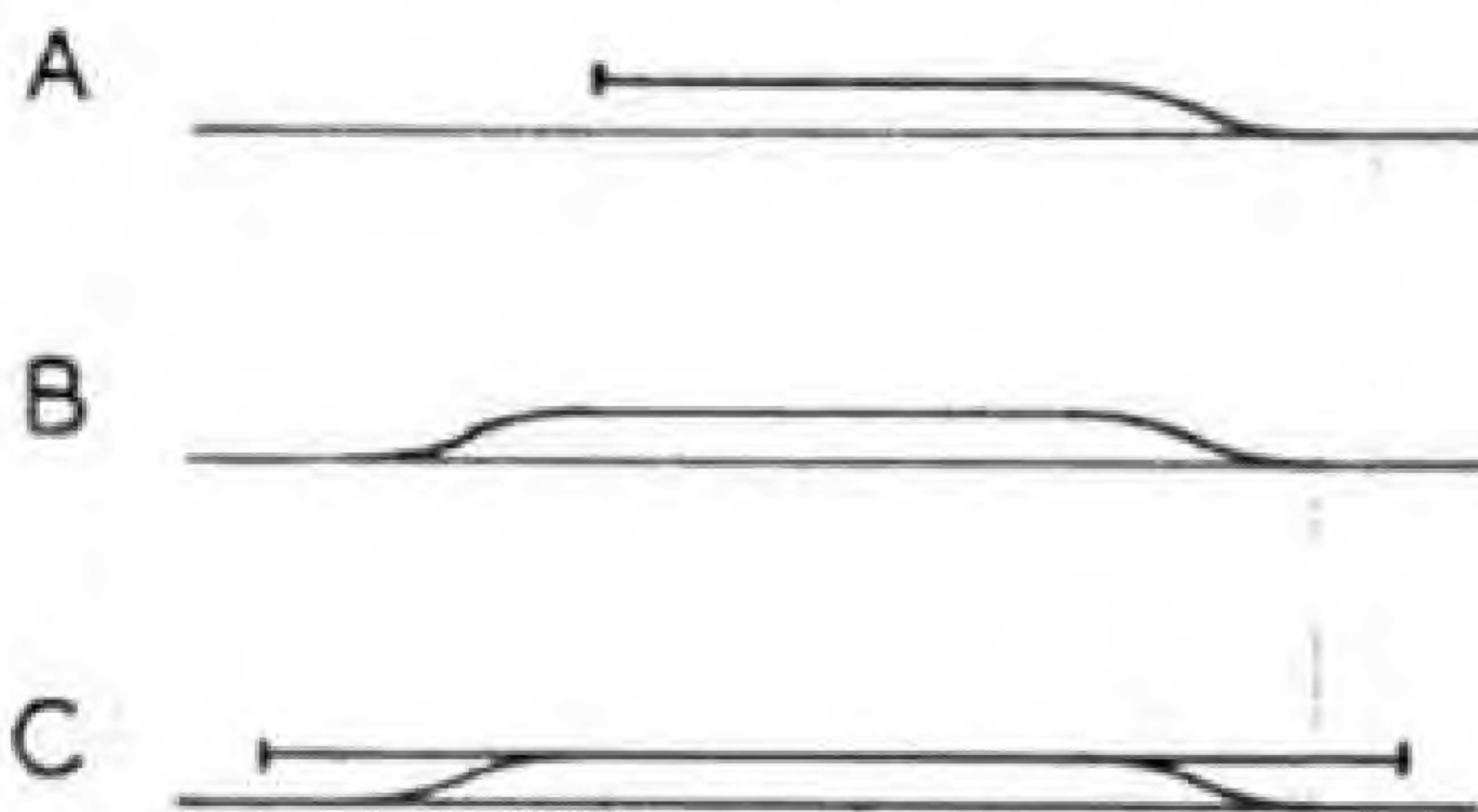
Dead end sidings and a loop line are shown in this illustration. The loop line is being used for "running round" purposes by the locomotive that has arrived with a passenger train.

at either end by a train from the main line, the Points being set and the train simply running straight in. Access to the main line is equally easy, the train running out as soon as the line is clear. No backing or reversing movements are therefore necessary whichever way the train happens to be travelling. Sometimes of course there is not sufficient space for a loop line. Unless it is long enough to hold a train of average length there is not much point in providing a loop. A dead-end siding on the other hand can be run round inside the curve at the end of the main oval, or it can be laid at an angle across the layout in order to gain length and still be of use in operating. The individual railway owner therefore must decide whether a siding or a loop will best suit the conditions on his layout.

In actual practice running loops are invariably provided at each end with a spur, of greater or less length according to the site, in the manner shown at C in the diagram. Then the points at each end of the plain loop become crossover points and the spur tracks are invariably provided with buffer stops. On a Dublo layout the same scheme can be followed if space permits, and the appearance of the loop will then be most realistic. Crossover Points are formed by

using two Dublo Points of the same "hand" together, so that the complete loop laid in this way will require four Points in all, that is to say, two Right-hand and two Left-hand.

Whether plain sidings or either form of loop line shown are used, developments are always possible. Readers will remember the shunting layout shown on page 114 of the "M.M." last month. In this the complete yard consisted of a loop with a spur at one end; from the loop there branched off a line leading to a series of dead-end sidings, the whole being well adapted to shunting and marshallings operations. A point to note was that the spur line was prolonged and was capable of holding several wagons if required.

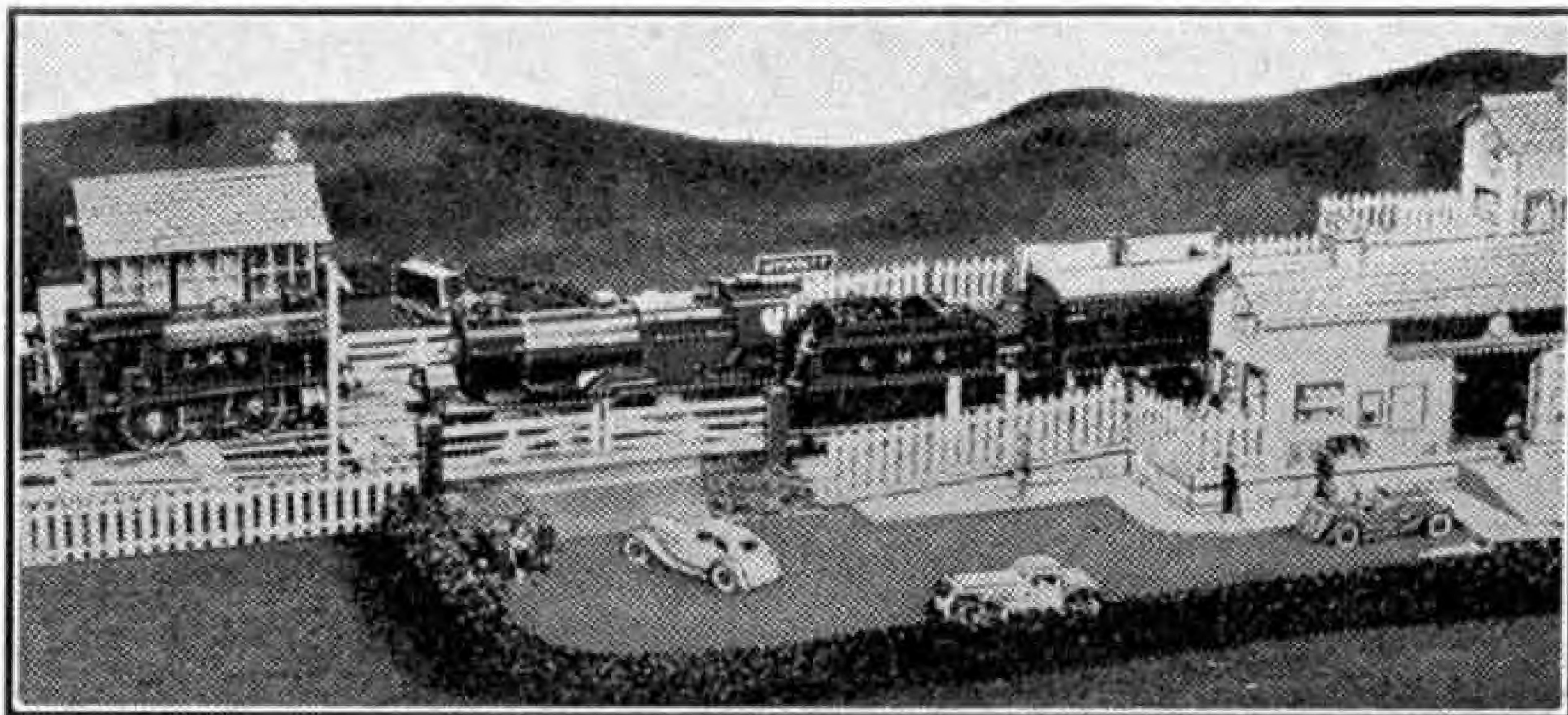


The diagram referred to in this article. A shows a simple dead-end siding; B shows a loop line developed from it and C shows a similar loop with a "spur" or extension at each end.

A Useful Hornby Layout Plan

ALL Hornby Train owners are familiar with the circular and oval layouts on which early train operations are usually conducted. Frequently developments from these simple rail plans remain in use for long periods, either as permanent or semi-permanent systems. The diagram on this page shows a useful

past the intermediate station on the left-hand side of the main oval. Through the tunnel on the opposite side of the track we go, and then come to the points outside the terminus. We pass the first or facing points, round the curve following, and then come to a stand just past the next set of points. From here we can back on to our train at the platform.



A typical wayside station scene. This arrangement could easily be formed on a layout as described on this page, the track being doubled through the station to allow up and down trains to "cross" one another.

extension of the popular oval; it is very little trouble to lay down, yet its possibilities in the way of interesting train operations are very much greater.

The main line is oval, but if necessary deviations from this actual shape are possible so long as the continuous form is retained. Similarly, although the terminal branches in the right-hand top corner of the diagram and the siding leading to the Engine Shed are shown in particular positions, they need not be laid down exactly as in the diagram as long as the same principles are observed. On a temporary layout arranged on the floor in a living room, for instance, the line may have to be altered here and there to avoid certain items of furniture and so on.

One of the chief points to be noted in connection with this plan is the arrangement of the terminal lines in the right-hand top corner. These lines are parallel to one another where they serve the platforms; then, diverging from one another, they join up with the main line by means of facing and trailing points respectively. The special advantage of the arrangement is best seen if we describe a typical running operation.

As the layout is a simple one we will assume that the coaches forming our train are usually stored alongside the upper or departure platform. This is quite a common practice on miniature railways where space or equipment does not permit of the installation of special carriage sidings. Our engine is standing in the Engine Shed, chimney end outermost; after a halt alongside the Water Tank we leave the yard and reach the main line. If the Shed is supposed to be some distance away from the main station, as sheds serving big towns often are, we can carry on along the main line

immediately there will be trouble when the train comes round again! The train is now well-launched on its main line run, and after threading the tunnel it continues on its way over the points at the head of the terminal lines, and so to a stop if necessary at the passing station.

The number of circuits of the main track to be covered by any particular train rests with the owner of the layout, or the "Superintendent" if there are several operators. When the time comes for the train to complete its journey, the

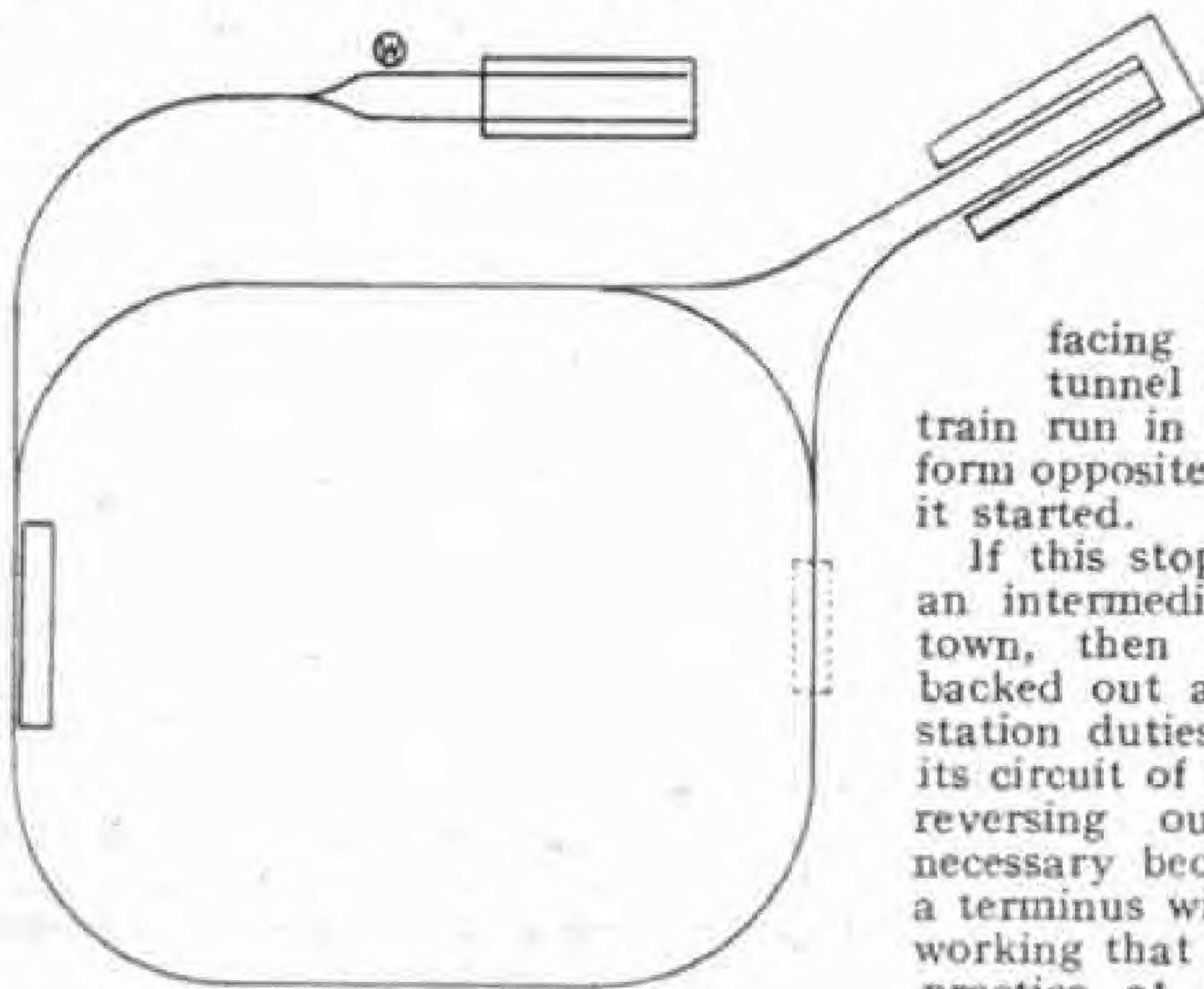
facing points beyond the tunnel can be set and the train run in alongside the platform opposite to that from which it started.

If this stop represents merely an intermediate halt at a big town, then the train can be backed out after performing its station duties, and then resume its circuit of the main line. This reversing out that is made necessary because the station is a terminus will be similar to the working that is necessary in real practice at Leeds (Wellington) with the Midland Section through trains of the L.M.S.

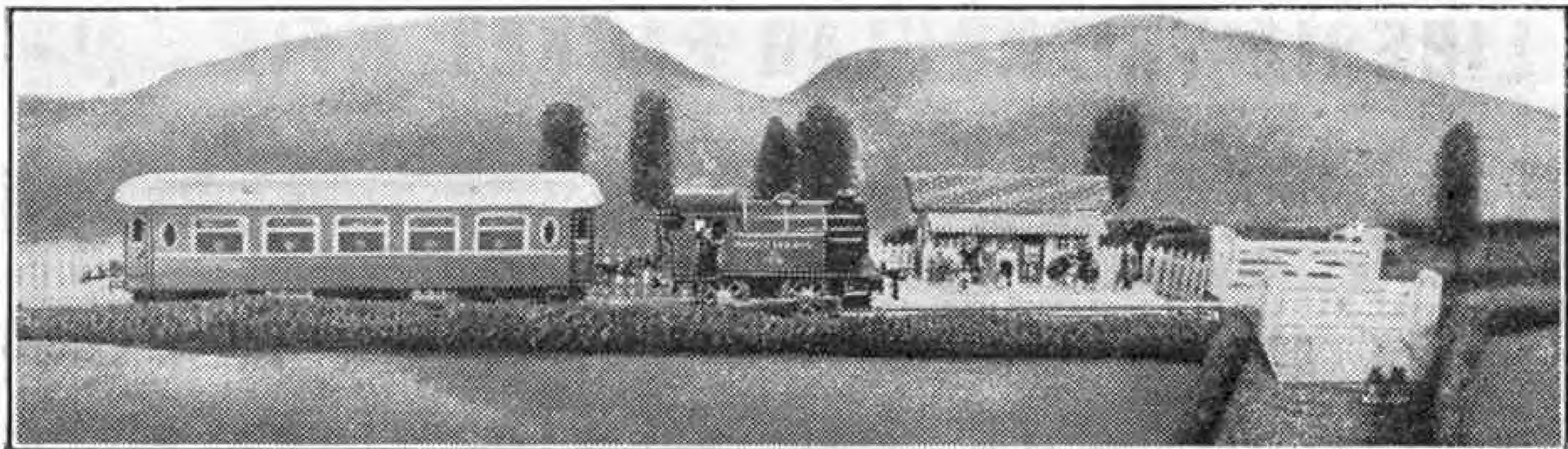
If the journey is complete, however, and the engine and stock are to be put away until the next trip, the train will be

backed out from the arrival platform. The facing points are re-set and the engine draws forward round the main line until the last vehicle has cleared the points that lead to the departure line; then the vehicles are backed in alongside the platform where we found them first, and the engine can be returned to the shed.

Variations of this scheme provide lots of fun.



The layout referred to in this article. It is a development of the plain oval track familiar to all "M.M." readers.



A busy wayside station on a branch or "light" railway in miniature.

Fun With Your Hornby Trains

"Light Railway" Operations

THE running of main line train services in miniature probably represents the aim of the great majority of Hornby Train owners. Often, however, space restrictions or lack of equipment prevent readers from following up the schemes that are described in these pages from time to time. The beginner in the model railway hobby usually has rather a miscellaneous collection of rolling stock, and he wishes to know just how to use it in order to carry out realistic working. This article provides a possible solution to the problem.

Instead of attempting to reproduce main line conditions and operations, we turn our attention to a simpler sphere of railway working. The various branch lines and light railways up and down the country often have features of special interest in their situation or working, and it is not difficult to work out a general scheme for reproducing their main operations in miniature.

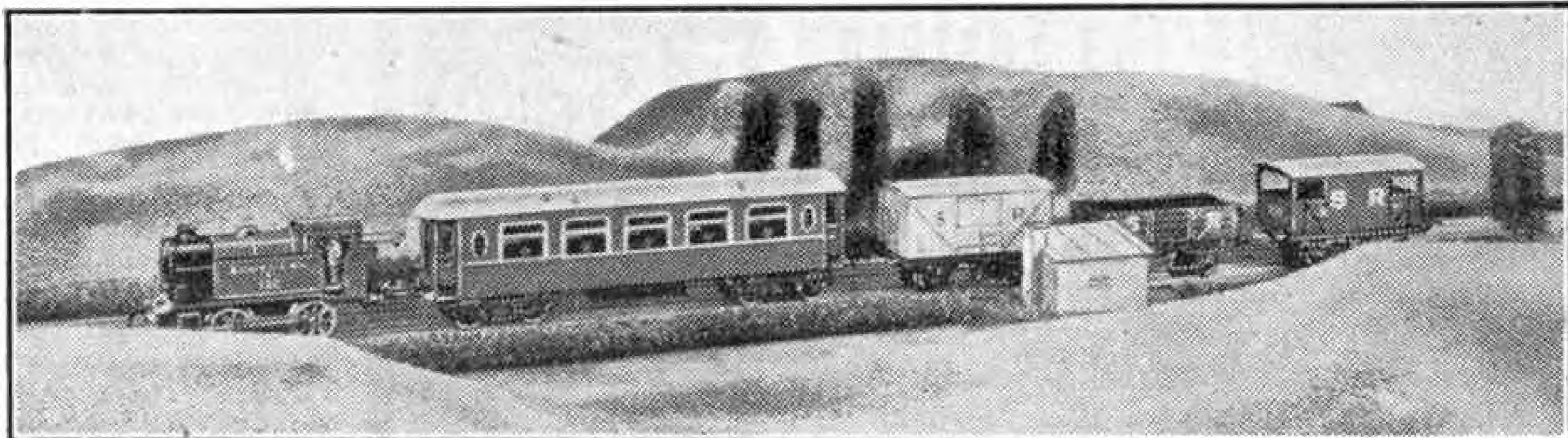
Light railways, although they may be of standard gauge and connected to one or other of the big systems, are invariably simple in their general character. Single track is the rule, with passing places perhaps at certain stations or convenient intermediate points. This of course is frequently the practice on miniature railways. Similarly, where signalling is employed it is usually in the neighbourhood of stations or junctions only. This makes it possible to obtain the correct effect with limited signalling equipment, and it makes the management of the signals very easy, as they are likely to be more or less concentrated in the one place. The ordinary stretches of track therefore can be without signals, but it is well to have one or two installed at stations, it only to indicate whether the train is supposed to make a stop or not.

The stations themselves are usually simple affairs,

so that for intermediate stopping places a length of standard Passenger Platform would be quite suitable; alternatively one of the small M Stations or Halts could be employed quite well. Actually the components of the M Station Set can be used effectively in schemes of the kind we are considering.

In making up the trains themselves it is possible to obtain realistic effects with a wide variety of rolling stock as the equipment of many of these secondary railways varies to a surprising extent. There may be a "set train" perhaps of several four-wheeled passenger coaches, so that here the No. 1 Passenger Coaches will be suitable. Quite frequently however the vehicles in the same train may be odd, having been obtained from different sources at different times. Often the end-door centre gangway type of coach is used on these lines. Therefore if we have any of the smaller Pullmans of the Hornby Series these can be used together with, perhaps, an American-type Pullman; this mixture of stock will be quite in keeping with light railway practice.

Where large vehicles such as No. 2 bogie stock are available, these can be used, although there may be possibly only one vehicle of a kind. The No. 2 Saloon Coach is a representative end-door vehicle and could be used alone or with a No. 2 Brake-Third compartment type Coach. Frequently stock under repair on a light railway is replaced temporarily by vehicles borrowed from the nearest "big" system, so that the use of coaches in, say, S.R. colours can be explained in this way. Even when such stock is purchased it frequently retains the finish of the original owners. Therefore it is possible for us to have a number of passenger vehicles all in different styles or colours and still be correct. The illustration below shows how a "mixed" passenger and goods train can be assembled.



Mixed trains are commonly run on "light" railways, worked by a single locomotive. Here is a Hornby "mixed train" on a Gauge 0 layout.

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G. P. KEEF
Willington, Eastbourne

Stamp Collecting

What is Philately?

By T. J. Edwards

HERE is a question I am often asked—"Are stamp collecting and philately the same thing?" Not a few of the questioners express surprise when an emphatic "No!" is given as answer. It is true that a philatelist is necessarily a stamp collector, but a stamp collector is not necessarily a philatelist. The explanation is that philately is to some degree a science, involving the study of postage stamps and postal services; stamp collecting, in its most elementary form at any rate, consists of mere accumulation for the simple joy of possession.

It is difficult to say just when a stamp collector becomes a philatelist; probably it is at the moment he decides to write up his stamps by adding notes concerning them to his album pages. The notes may not be original, for they may consist of facts ascertained from a stamp catalogue; but even so they have called for a certain amount of study to find them. From such a simple start the philatelist may go on to advanced researches, and possibly to discover facts that nobody else has found.

The average philatelist lies somewhere between these elementary and advanced stages. And he finds a lot of enjoyment in his hobby.

The stamp collector who desires to get the best from his stamps must go beyond mere accumulation of numbers, and must try to do three things—take a pride in selecting specimens

his stamps to tell a story that non-collectors can understand when they look over the album.

Another question that is often asked is: "Can philately be made to pay?" The answer to this question is a not-so-emphatic "Yes!" The financial side of philately is a matter that affects individual collectors differently. If one sets out to collect only stamps that are likely to show a profit quickly, one cannot hope to show an

interesting collection. My view is that the philatelist should regard his hobby as he does any other form of recreation, and look upon the money he spends on stamps as repaid by the pleasure he obtains from the stamps. But stamps do increase in value with the passage of time. The philatelist may therefore quite rightly regard his stamps as an investment on which he can realise at least some part of the cost.

From the investment standpoint there is no doubt that the specialised collection is to be desired above a general collection. That is not to say that a general collection cannot return to its owner a good return on his outlay, should he wish to sell it; but usually the specialised collection will return a greater sum

from the same outlay.

There is an important lesson in this fact for the young collector who is compelled to build his collection largely with presents from his relatives and friends, and only in part with stamps bought from his own resources. A specialised collection shows a greater return because it usually has a greater degree of completeness—that is it contains fewer gaps in individual sets—than a general collection that has sought to cover a wider range of issues. The lesson is that young collectors, when buying stamps, should use their funds to fill in gaps in sets that have been partially filled by gifts from friends. When one wishes to sell, a dealer will offer a far bigger price for a complete set than for a broken one.

The young collector whose funds are limited to his pocket allowance would do well, therefore, to decide on one country, or one small group of countries, on which to concentrate when spending. There is no reason why he should not continue to collect, by means of gifts, stamps of other countries; indeed, it would be silly not to do so. But, since he cannot hope to fill in all the gaps, he will find increasing pleasure in his special field.

Here I must give a serious word of warning. If the collector wishes to ensure the investment value of his collection, he must collect only good stamps. I do not mean rare stamps only, but stamps that are perfect. Used specimens must not be heavily postmarked; unused stamps must be as nearly as possible in mint condition, that is in the state in which they left the Post Office. They must not be even the tiniest bit torn, and all their perforation teeth must be present, for the absence of even one tooth makes a big difference. By all means fill a gap with an imperfect stamp, but do not be content to leave it there if a better specimen comes along later. And never buy a stamp that is poor and defective unless it is certain that a better one cannot be obtained by waiting a little while longer. There are few stamps of which that can be said.

Readers who follow the advice given in this article will find, in days to come, that all the trouble and care will be repaid handsomely; first, in a collection that will always be pleasant to look at, and, second, in one that will be easy to sell should that necessity unhappily arise.



Ceylon, 1859, 8d. brown, catalogued at £230 to-day.



Canada 1859 12½c., a pair now worth £50.



A block of four 3c. surcharged on 6c. with surcharge inverted, sold for 6d. in Newfoundland in 1929; now worth £60.



Superb specimens of the first postage stamp, Great Britain's 1d. black. This stamp is worth £1 to £20 to-day, according to the plate from which it was printed.

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LISBURN & TOWNSEND (MM), LIVERPOOL 3

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Catalogued 10d., 2/6, 6/-—penny each! Approval, 3d. postage please. J. Baguley, Weston Colville, Cambs.

FREE GIFT to all applicants for approvals. Gosling, c/o G.P.O., Post Restante, Dumfries, Scotland.

Stamp Gossip and Notes on New Issues

New British Colonial Issues

We do not usually recommend young collectors to pay great heed to minor differences of perforation, although this is a field full of interest to the advanced collector. Our readers should keep a keen watch for new printings of British Colonial issues, however, for there are likely to be some scarce—and later valuable—items among the new perforation varieties that are appearing.

The New Zealand 4d., 6d. and 1/- values have appeared perf. 14, 12½ and 12½ respectively. Papua



A pair of the "Sydney Views" issued at 1d. each in 1850. This is worth £30 to-day.

has re-issued the 4d. value perf. 11½, instead of perf. 11 as in the original issue of 1932. Most important, in the light of recent war events, are five values from Hong Kong, the 2c., 5c., 10c., 30c. and 50c., issued perf. 14½ x 14, instead of 13½-14 x 14 as in the previous printing. This printing is likely to prove very scarce, and copies will certainly improve in value very rapidly.

For the benefit of new collectors we ought to explain that perforations are measured by the number of them in a length of two centimetres. Where the number differs as between the top and the sides of the stamps, the top measurement is quoted first. Sometimes the measurement is not readable exactly. In such cases, it is usual to quote to the nearest ½. In other cases there may be very slight variations as between stamps of the same printing. These may be ignored. They are not varieties, the variation arising out of irregular shrinking of the paper after printing. In some printing processes the paper must be damped slightly to ensure a perfect impression from the printing plate.

America has a philatelic feature that might well be copied by some enterprising person in Britain—a school for philatelists. We wonder whether the "M.M." is

read in that school. Recently one of its principals, in giving a talk on stamp catalogues, remarked that "the collector who would venture to collect without the services of an up-to-date stamp catalogue is in the same position as a mariner who set sail without a compass."

The phrase was considered so striking that it was reprinted in one of America's leading stamp weeklies. To some readers of the "M.M." it will have a familiar ring. We used almost the identical words in the Stamp Collecting pages of the October 1928 "M.M.," and again in the January issue of 1931.

The British Columbia "V" Stamp

Readers will be interested to see here the British Columbia stamp of 1865 to which we referred in last month's "M.M." Interestingly enough, as far as we can trace, no other magazine in this country has noted the extraordinary fact that the famous "V" sign had already appeared, with a propaganda purpose, in a British Colony 80 years before its adoption as the symbol of European resistance to Nazi tyranny. The . . . — can be seen in each of the arms of the "V," doubtless introduced by the designer as a novel means of embellishing the design and breaking up the white space in the arms.



British Columbia 3d., 1865, the stamp with the "Victory" design.

A new issue that readers should keep in mind to acquire as soon as conditions permit—it cannot be imported at present—is Mexico's series celebrating the quadricentennial celebrations of the Foundation of Merida, the capital city of the province of Yucatan. Merida was founded in 1542 on the site of the ancient Mayan city of T-Ho and each of the designs of the stamps refers to the ancient foundation. The 1c. value shows a view of Mayan ruins, the 5c. some ancient Mayan carving, and the 10c. the arms of Merida, which incorporate Mayan carving in their shield. The airmail series bears designs as follows: 20c., an old Mayan fort; 40c., the facade of the ancient Mayan university; 1p., the plaza at Merida and a panel of Mayan carving.

These records of an ancient civilisation would be an attractive addition to a collection of archaeological stamps.

New French Colonial Charities

The extent to which France is relying upon new stamp issues to bolster up the national revenue in the present unhappy circumstances of the country is most remarkably illustrated in the New Issue columns of one of our British stamp magazines. No less than seven columns are devoted to a list of new charity issues that appeared in France and her colonies toward the close of last year. Eight new stamps are listed from France itself, the most interesting being a 1 franc charity bearing a premium of 9 francs, in aid of fishermen's charities. It was hoped to raise ten millions of francs from stamp collectors by means of this stamp.

Eight of the Colonies each issued three charity stamps, while seven issued seven stamps consisting of two sets of three and four stamps respectively. The 15 sets of three stamps were a more or less uniform series throughout the 15 colonies, and all bore designs depicting types of native or colonial soldiery.

New printings have been made

of the current Newfoundland 2c. and 4c. stamps.

Acknowledgment

The rare stamps illustrated in our pages this month, by courtesy of H. R. Harmer of Bond Street, London, are examples of perfect specimens of low face value stamps that have proved good investments for their owners. The common stamps of to-day may be the rarities of to-morrow, and the young collector who concentrates on obtaining only perfect specimens of to-day's common stamps will find the greatest benefit from his wise collecting.



A block of four 1/- green Cape triangulars of 1855-58, now valued at £25.

African Plant Curiosities

Many strange plants are to be found in various parts of Africa, and one of the most remarkable of these is the *Welwitschia Mirabilis*. This is truly a botanical wonder, and it occurs only in a narrow strip of desert country in South West Africa. It is a huge plant. Two enormous leaves spread out from its stem to a length of from 6 ft. to 10 ft. Their breadth is as much as 2 ft., but the winds that sweep across the desert cut the leaves lengthwise into bands that lie along the ground. Its roots penetrate to a depth of about 10 ft.

Welwitschia grows slowly. A specimen planted at Cambridge in this country increased by only 9 in. in 37 years, and one consequence of its slow growth is that it is long-lived, specimens being thought to grow for hundreds of years. In its desert home it obtains

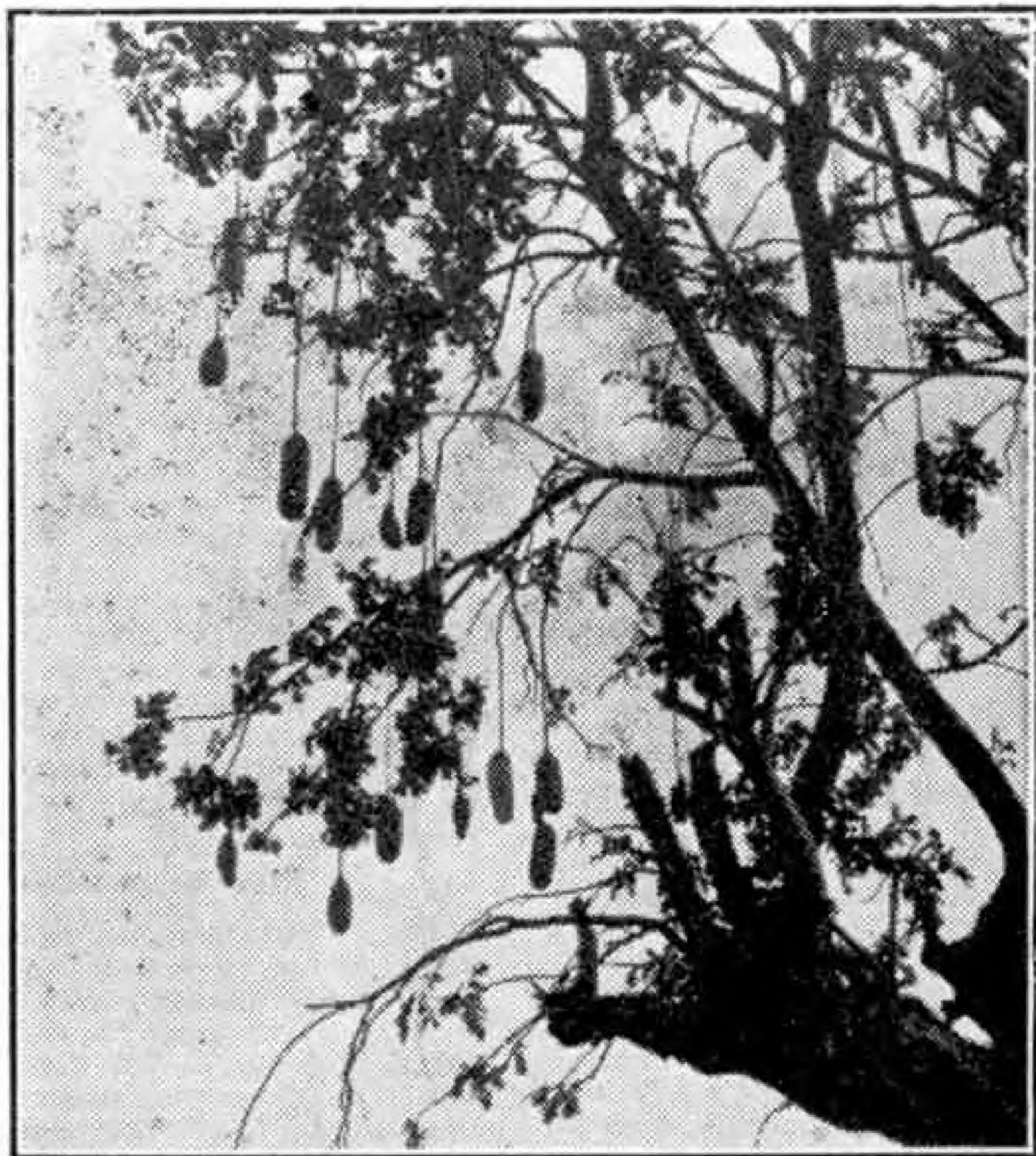
its moisture from mists, for there the average rainfall is only 1 in. a year.

This strange plant is named after Dr. Welwitsch, a Swedish naturalist who first brought it to general notice.

Sponge that Grows on a Tree

Another of the curiosities of Africa is the long narrow bath sponge usually called a "loofah." Unlike the sponge this is not a product of the sea, as is commonly supposed, but grows on a tree that occurs in East Africa and Egypt. It is actually obtained from a cylindrical fruit of the gourd variety. This is sometimes as long as 3 ft., and has a tough fibrous network encasing the seeds. When the hard outer case and seeds have been removed, the fibre remaining is dried, and the result is the loofah.

E. F. WEGG.



The loofah is not a sea product like the ordinary sponge. It is the dried network in which the seeds of an East African tree are enclosed. Our illustration shows one of these trees with the fruits growing. Photograph by E. F. Wegg, South Africa.

Moths That Live Inside Trees—

(Continued from page 135)

among the currant bushes. Soon the wild males began to collect around these little boxes, having discovered the presence of the females by their sensitive antennae; and as they could not gain access to the boxes they continued to swarm around them. All my father had to do was to stand by and sweep them up in his butterfly net. In one morning he caught over three hundred!

COMPETITION RESULTS

HOME SECTION

December "Locomotive Figureword" Contest.—1. J. P. Tyrrell, Walton-on-Thames. 2. C. E. Evans, Altrincham. 3. M. M. Clark, Teddington. Consolation Prizes: C. Eley, High Wycombe; J. G. H. Ellisson, Gravesend; A. J. Tyrrell, Walton-on-Thames.

December Photo Contest.—1st Prizes, Section A: W. Wyatt, Liverpool; Section B: M. Taylor, Southall. 2nd Prizes, Section A: S. S. Pethybridge, Newton Abbot; Section B: G. P. Duncan, Edinburgh 11. Consolation Prizes: W. Barr, Birkenhead; P. J. Searby, Harpenden; P. H. Honour, St. Peter's-in-Thames; M. Gainsborough-Waring, Shepperton.

January Photo Contest.—1st Prizes, Section A: S. Pollard, Weaverham; Section B: T. C. Millington, Chelford. 2nd Prizes, Section A: J. Mitchell, Bradford; Section B: A. Rose, Ulverston. Consolation Prizes: J. Durey, Newcastle-

on-Tyne; M. W. Taylor, Southall.

H.R.C. January "Spot the Errors" Contest.—1. G. Balfour, Upminster. 2. C. E. Wrayford, Bovey Tracey. 3. W. Charters, Glasgow N. Consolation Prizes: F. Mills, Kearsley; M. de Ridder, Penrith; R. A. Hawley, Crewe.

February "Hidden Word" Contest.—1. A. G. Ford, Leicester. 2. F. Nailer, Wembley Park. 3. J. H. Lethbridge, London N.11. Consolation Prizes: A. McIntyre, Paisley; H. B. Clarke, N. Watford; D. M. Carlisle, Alderley Edge.

OVERSEAS SECTION

May "Errors" Contest.—1. J. D. Burnell, Cape Town, S.A. 2. G. Myburgh, Cape Town, S.A. 3. J. Swift, Wellington, N.Z.

June "Letter-Square" Contest.—1. W. Bradfield, Levin, N.Z. 2. F. A. Meeke, Canberra, Australia. 3. P. Worthington, Vancouver, B.C. Consolation Prizes: K. Boocock, Oxford, N.Z.; W. Warren Jenson, Nelson, N.Z.; Grame Garland, Cambridge, N.Z.

June "Jumbled Names" Contest.—1. G. F. Vollmer, Ontario. 2. B. F. Meire, Canberra, N.Z. 3. F. Jowett, Ontario. Consolation Prize: J. D. Burnell, Cape Town.

July "Hidden Names" Contest.—1. H. Charles, Alberta. 2. D. Williams, Sydney, N.S.W. 3. M. Hewitt, Madras.

Competitions! Open To All Readers

Hidden Advertisements

Readers always enjoy competitions of the jig-saw variety, in which they are asked to identify pieces of advertisements, or to track down to their origin snatches of descriptive matter chosen from these. Our competition this month is of the second of these types. In the panel on this page is a series of statements, each based on an advertisement in this month's issue. The actual wording may not be the same as in the advertisement itself, but the idea is quite clearly reproduced, and readers are asked to say which advertisements the statements come from.

To help readers to understand exactly what is wanted we may take the first clue, "Wait until June." A hunt through the advertisement pages reveals the fact that on page ii Lotts Bricks Ltd. tell readers that further quantities of their products will not be

1. Wait until June.
2. All stamp collectors are advised to obtain this at once.
3. 40,000 copies have been sold.
4. Has given 50 years service.
5. Good prints are certain.
6. Three methods were used to propel this.
7. All the best makes stocked.
8. Measures 14 in. by 9 in.
9. Expires after 30 days.
10. Cannot be obtained direct.
11. Dad was right.
12. You cannot afford to miss it.
13. Can be obtained by post only.
14. Buy these while you can.
15. A good wartime hobby.
16. A personal triumph.

available until that month. The solution to No. 1 therefore is Lotts Bricks Ltd., page ii.

There will be separate sections in this contest for Home and Overseas readers, and in each of these there will be prizes of 21/-, 10/6 and 5/- for the best entries. In addition consolation prizes will be awarded for other entries deserving of recognition, and the judges will take neatness and originality into account if there is a tie for any prize.

Entries should be addressed "April Advertisement Contest,

Meccano Magazine, Binns Road, Liverpool 13," and competitors must remember to write their names and addresses on their entries. The closing date in the Home Section is 30th April, and entries in the Overseas Section should be sent off to reach Liverpool not later than 31st August.

What Engines Are These?

One of our representatives recently made an interesting railway journey during which he saw examples of various locomotive types. He then wrote an account of his trip, but he did not identify these engines. His descriptions provide clues from which readers should be able to do this, however, and in this month's pages therefore we ask them to give the class and wheel arrangement of all the locomotives seen, together with the name of the owning company. The story is reproduced below.

"As we left the station I noticed a 4-4-0 locomotive with a large cab and an interesting nameplate over the leading splashers; this locomotive was backing on to a light express passenger train of coaches of teak colour. On the turntable near the engine shed I saw a streamlined 2-8-2 engine, very similar in appearance to the A4 'Pacifics,' and after a short interval a heavy mineral train hauled by an 0-6-0 locomotive passed by, travelling in the opposite direction. This engine had a short wheelbase, but looked very powerful.

"The next few miles of the journey were uneventful, but presently a mixed freight train appeared. At its head was a powerful looking engine with large driving wheels and Walschaerts valve gear. Its cab had large wide windows and was nearly above the last pair of coupled wheels. Presently we reached a junction near our destination, and there we had to stop for a time owing to signals being at danger. Just then a suburban passenger train appeared on the other track, hauled by a smart black tank engine with a high bunker and a round-topped cab with no side windows. This locomotive interested me greatly, for it was fitted with condensing pipes that passed along the sides of the boiler into the tanks.

"Soon after this train had cleared the junction we proceeded towards the large terminal station, where

I alighted. This gave me a chance to examine the locomotive that had hauled our train; it was green in colour and powerful in appearance, with a wide fire-box and a large boiler. The tender was also attractive, as it had a small corridor along the right hand side. Naturally I looked round the station before leaving it, the most attractive locomotive present being a large blue streamlined one standing at the head of a long passenger train waiting for the right away."

There are the usual two sections in this contest, for Home and Overseas readers respectively, and in each prizes to the value of 21/-, 10/6 and 5/- will be awarded for the best solutions. Entries must be addressed "April Locomotive Contest, Meccano Magazine, Binns Road, Liverpool 13." The closing dates are: Home section, 30th April; Overseas section, 31st August.

April Photographic Contest

In this month's photographic contest prizes are offered for the best photograph of any kind submitted. There are two conditions—1, that the photograph must have been taken by the competitor; and 2, that on the back of each print must be stated exactly what the photograph represents. A fancy title may be added if desired. We remind readers that they must not photograph any features of military importance.

Entries will be divided into two sections, A for readers aged 16 and over, and B for those under 16. They should be addressed "April Photo Contest, Meccano Magazine, Binns Road, Liverpool 13." There will be separate sections for Overseas readers.

In each section prizes of 15/- and 7/6 will be awarded together with consolation prizes for other good efforts. Closing dates: Home Section, 30th April; Overseas Section, 31st August.

Fireside Fun

"Be careful with this money, Johnny," said Uncle Tom as he gave his nephew a pound note at the end of a visit. "Remember! A fool and his money are soon parted."

"Yes, uncle," replied Johnny. "Thank you for parting with it, just the same."

Scot, in nursery garden: "Hae ye a nice cucumber?"

Gardener: "Aye, there's one, eighteenpence."

Scot: "Ower dear. Hae ye one at ninepence?"

Gardener: "Ye can hae this little one for that."

Scot: "That'll dae. Here's the ninepence, but dinna cut it. I'll call for it in a fortnight."

A holiday-maker in Ireland who hired a cab was surprised when it was pulled up at the foot of a hill, and the driver appeared at the door.

"I didn't tell you to stop here," he protested.

"Whist" was the reply. "If I bang the door the baste will think ye're gone and he'll go up the hill like the wind. He'll stop if he hears ye, so be quiet."

"If this is lamb, I'm a fool," grumbled the surly diner.

"Quite right, sir," said the waiter cheerfully. "It is lamb."

"Ma old man done says I married him fo' his insurance."

"Well, yo' did, yo' know."

"Yes, I sho' did. But ah'm willin' to let him die natural."

A small boy carrying a football was being led along the street by a policeman, while an angry woman further along was looking at her broken window. At the corner a group of the boy's friends met him and his escort.

"What's he takin' you for?" asked one of them.

"Nuthin'," was the reply, "I'm just going to sign on for the cop's team."

"While I was at camp I made omelettes out of doors every morning."

"Well, something had to take the place of the eggs, I suppose."



American host: "What d'you think of that fine building, eh?"

British evacuee: "Ee! What a grand time we could have sliding down the banisters!"

"Everything bought goes to the buyer."

"What about coal? That always goes to the cellar."

"We all like you better than the last superintendent," said the inmate of a lunatic asylum to the new head.

"I am pleased to hear you say so," replied the latter. "And why do you prefer me?"

"Well, sir, you seem more like one of us."

"Now, are you quite sure you haven't left anything?" brightly asked the seaside landlady of a departing guest.

"That's the wrong question," was the reply. "What you mean is, have I anything left?"

"Is this anti-wrinkle cream really good?"

"Madam, it would smooth out a corrugated iron roof."

Teacher: "What is cowhide chiefly used for?"

Pupil: "To keep the cow together, sir."

ENTERTAINMENT

He: "Are ye fond of moving pictures, Jennie?"

She (hopefully): "Aye, Sandy."

He: "Then maybe, lass, ye'll help me to get half-a-dozen doon out o' the attic."

EDUCATIONAL

Two small British boys were gazing at the shop windows decorated for Christmas. Presently they came to a butcher's shop, and one of them pointed to a number of hams hanging from a large holly branch.

"Look, Tom," he said. "Look at them 'ams a-growing up there."

"Get away," said the other. "Don't you know 'ams don't grow."

"Well, that's all you know about it," said the first scornfully. "Ain't you ever 'eard of a 'am-bush?"

Proud Mother: "Yes, he's a year old now, and he's been walking since he was eight months old."

Bored Visitor: "Really? He must be awfully tired."



"Excuse me, but when I came to inquire about the umbrella I'd lost, did I happen to leave my walking stick?"



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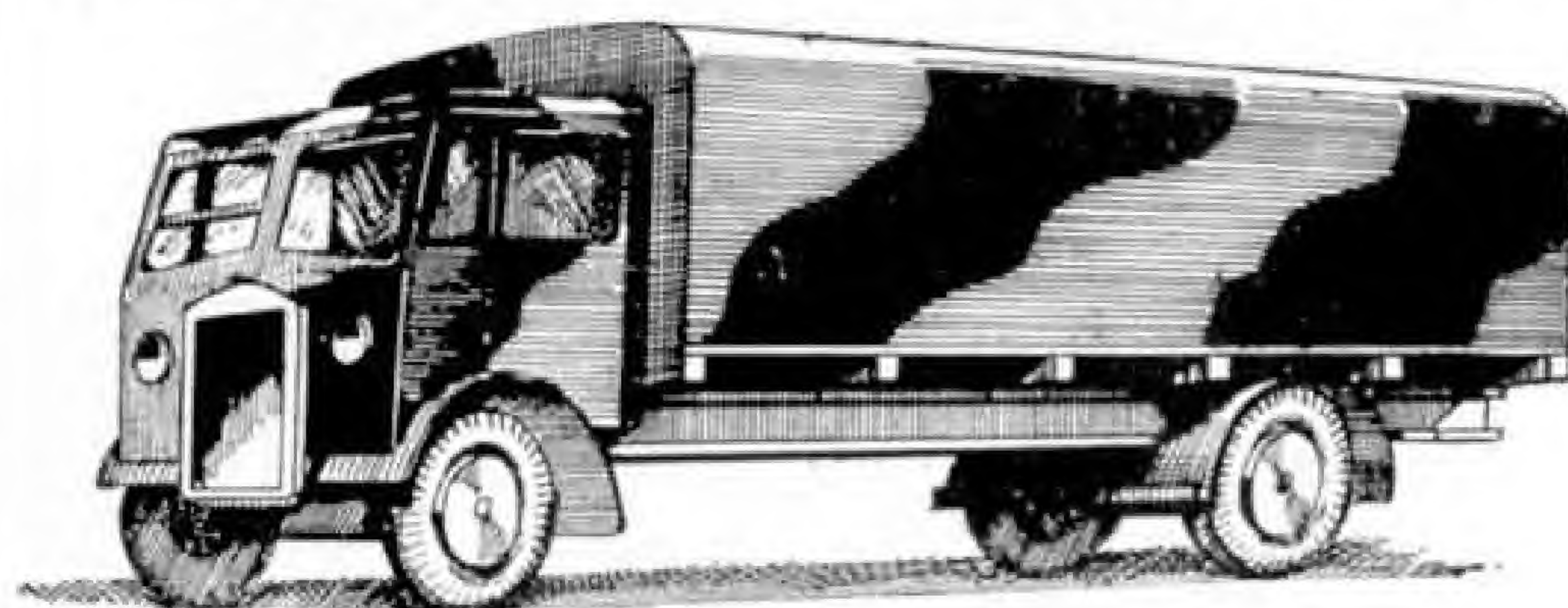
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